

ETERNUS

ETERNUS

VDS Hardware Provider
1.4.0

Software Information



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Preface

This document explains ETERNUS VDS Hardware Provider (hereafter "VDSHP"), this being software that supports the Microsoft Virtual Disk Service (VDS) storage management interface.

February 2010

Additional Information

The following expressions are used throughout this manual.


Warning Notations

Warning signs are shown throughout this manual in order to prevent injury to the user and/or material damage. These signs are composed of a symbol and a message describing the recommended level of caution.

IMPORTANT	This symbol indicates information that it is IMPORTANT for the user to note when using VDSHP.
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Informatory Notations

The following notation is used throughout this manual:

 Note	These sections indicate useful functions, methods and other information supplementary to the explanations already provided.
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Product names and abbreviations

"Windows Server® 2003" represents the following products.

- Microsoft® Windows Server® 2003 R2, Standard Edition
- Microsoft® Windows Server® 2003 R2, Enterprise Edition
- Microsoft® Windows Server® 2003 R2, Standard x64 Edition
- Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition
- Microsoft® Windows® Unified Data Storage Server 2003 Standard Edition
- Microsoft® Windows® Unified Data Storage Server 2003 Enterprise Edition
- Microsoft® Windows® Unified Data Storage Server 2003 Standard x64 Edition
- Microsoft® Windows® Unified Data Storage Server 2003 Enterprise x64 Edition

"Windows Server® 2008" represents the following products.

- Microsoft® Windows Server® 2008 Standard Edition
- Microsoft® Windows Server® 2008 Enterprise Edition
- Microsoft® Windows Server® 2008 Datacenter Edition

"Windows Server® 2008 R2" represents the following products.

- Microsoft® Windows Server® 2008 R2 Standard Edition
- Microsoft® Windows Server® 2008 R2 Enterprise Edition
- Microsoft® Windows Server® 2008 R2 Datacenter Edition

"Windows®" represents the following products.

- Microsoft® Windows Server® 2003
- Microsoft® Windows Server® 2008
- Microsoft® Windows Server® 2008 R2

"ETERNUS Web GUI" represents the following software.

- Web-based GUI management tool used to control the basic functions of the ETERNUS Disk storage system standard functions
- ETERNUSmgr provided with some ETERNUS Disk storage systems

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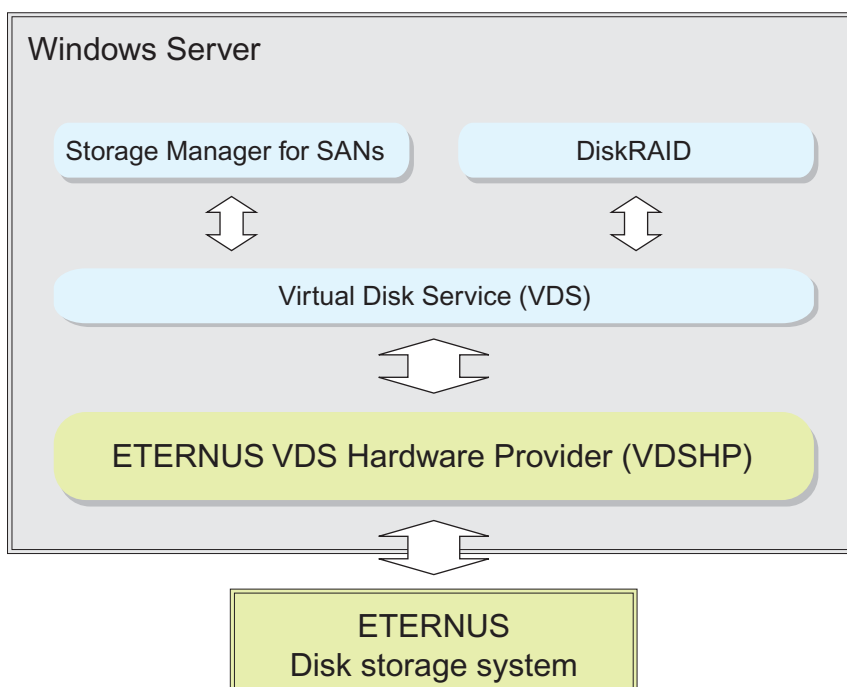
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Chapter 1 ETERNUS VDS Hardware Provider

ETERNUS VDS Hardware Provider (hereafter "VDSHP") is software that supports the Microsoft Virtual Disk Service (VDS) storage management interface. VDSHP enables use of storage management software such as Storage Manager for SANs, which is installed on Windows Server as standard, and configuration setup for ETERNUS Disk storage systems (hereafter referred to as "storage systems").



1.1 Support Specifications

OS	Windows Server 2003 R2 (32-bit, x64) SP2 or later Windows Unified Data Storage Server 2003 (32-bit, x64) SP2 or later Windows Server 2008 (32-bit, x64) (including SP2) Windows Server 2008 R2 (x64)		
VDS version	V1.1 (Windows Server 2003 R2, Windows Server 2008, Windows Server 2008 R2) V3.0 (Windows Server 2008 R2)		
HBA driver type	Fibre Channel: Storport miniport SAS: Storport miniport iSCSI: Microsoft iSCSI Software Initiator		
Storage management software	Storage Manager for SANs DiskRAID storageoobe (Storage Server) SCVMM		
Storage systems	ETERNUS DX60	Fibre Channel	firmware version V10L10 or later
	ETERNUS DX60	SAS	firmware version V10L20 or later
	ETERNUS DX60	iSCSI	firmware version V10L20 or later
	ETERNUS DX80	Fibre Channel	firmware version V10L10 or later
	ETERNUS DX80	SAS	firmware version V10L20 or later
	ETERNUS DX80	iSCSI	firmware version V10L20 or later
	ETERNUS DX90	Fibre Channel	firmware version V10L30 or later
	ETERNUS DX410	Fibre Channel	firmware version V20L41 or later
	ETERNUS DX440	Fibre Channel	firmware version V20L41 or later
	ETERNUS DX8100	Fibre Channel	firmware version V20L41 or later
	ETERNUS DX8400	Fibre Channel	firmware version V20L41 or later
	ETERNUS DX8700	Fibre Channel	firmware version V20L41 or later
	ETERNUS2000 Fibre Channel (all models)		firmware version V10L40 or later
	ETERNUS2000 SAS (all models)		firmware version V10L40 or later
	ETERNUS2000 iSCSI (all models)		firmware version V10L40 or later
	ETERNUS4000 Fibre Channel (model 300)		firmware version V11L52 or later
	ETERNUS4000 Fibre Channel (model 400)		firmware version V20L10 or later
	ETERNUS4000 Fibre Channel (model 500)		firmware version V11L52 or later
	ETERNUS4000 Fibre Channel (model 600)		firmware version V20L10 or later
	ETERNUS8000 Fibre Channel (model 700)		firmware version V11L52 or later
	ETERNUS8000 Fibre Channel (model 800)		firmware version V20L10 or later
	ETERNUS8000 Fibre Channel (model 900)		firmware version V11L52 or later
	ETERNUS8000 Fibre Channel (model 1100)		firmware version V11L52 or later
	ETERNUS8000 Fibre Channel (model 1200)		firmware version V20L10 or later
	ETERNUS8000 Fibre Channel (model 2100)		firmware version V11L52 or later
	ETERNUS8000 Fibre Channel (model 2200)		firmware version V20L10 or later
RAID levels	RAID1 RAID1+0 RAID5 RAID6		
Logical Volume	Open Volume		

Chapter 2 Important Points

2.1 Settings

Make sure to read the ETERNUS Disk storage system "Server Connection Guide" in advance, and perform each setting in ETERNUS Web GUI before using VDSHP. Settings for creation, expansion, assignment, releasing an assignment, and deletion of LUNs for storage systems, can be performed via VDSHP. Other settings must be performed using ETERNUS Web GUI.

2.2 Security

Servers with VDSHP installed allow any Administrators or Backup Operators group user to manage the storage system configuration. User accounts should be carefully controlled to ensure security. Similarly, since VDSHP control over the storage system is via LAN communication, the storage system network settings should be set to restrict access by non-authorized servers. Refer to the "ETERNUSmgr User Guide" or "Web GUI User Guide" for details.

2.3 Compatibility With Other Storage Management Software

VDSHP is not guaranteed to work properly and should not be used with other storage management software, such as ETERNUS SF Storage Cruiser or Systemwalker Resource Coordinator.

2.4 Firmware Upgrades and VDSHP Version

Upgrade VDSHP to the latest version when the storage system firmware is upgraded. This is to prevent the interface between VDSHP from being changed. The latest VDSHP can be obtained from the following URL:

<http://www.fujitsu.com/global/support/computing/storage/system/vdshp.html>

2.5 Other Cautions

Other cautions are described in ["Chapter 8 Cautions and Troubleshooting" \(page 45\)](#). Refer to the relevant section before using VDSHP.

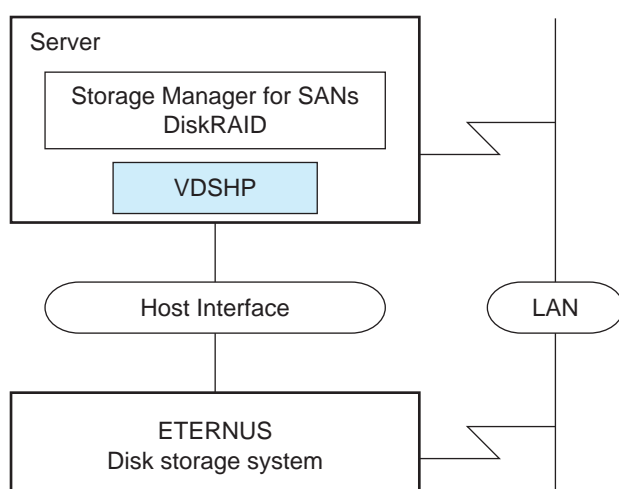
Chapter 3 Installation and Uninstallation

3.1 System Configuration

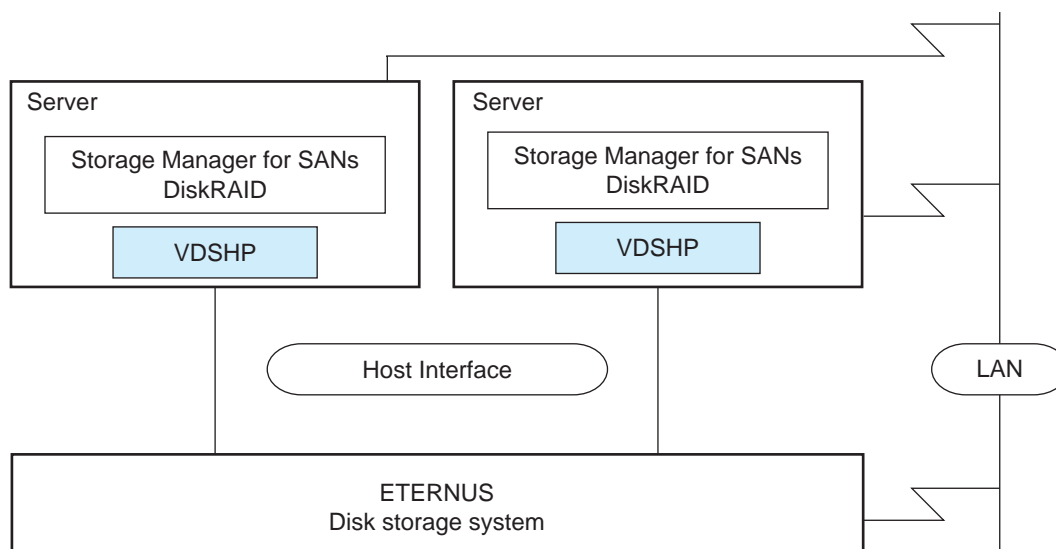
VDSHP is installed on a Storage Manager for SANs or DiskRAID (or similar) based storage management server. The storage system and VDSHP server are connected via LAN. The host servers that are assigned LUNs on the storage system are connected via a Fibre Channel, SAS, or iSCSI host interface. Multipath connection is possible if a multipath driver is used.

For cautions regarding the connection configuration, refer to ["Chapter 8 Cautions and Troubleshooting" \(page 45\)](#) before using VDSHP.

3.1.1 Example of a Single Server Connection Configuration

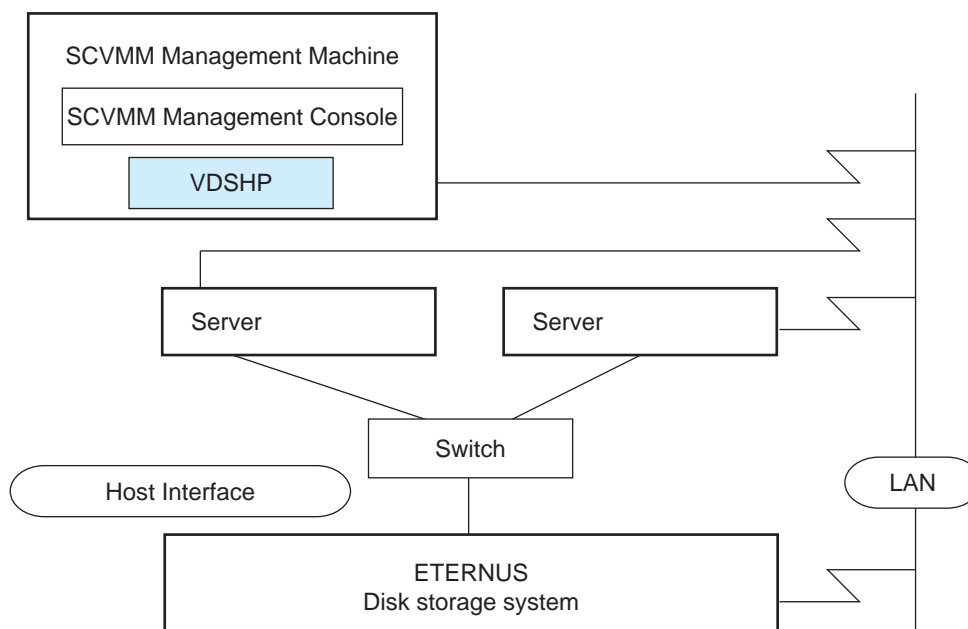


3.1.2 Example of a Cluster Connection Configuration



3.1.3 Example of a SCVMM Connection Configuration

To perform SAN Migration, the connection configuration must be as shown in the following diagram, with each server connected to a mutual ETERNUS disk storage system port.



3.2 Preparation

3.2.1 Connecting the LAN

VDSHP controls the storage system configuration via LAN.

Make sure that there is a LAN connection between the server on which VDSHP is to be installed and the storage system.

If the storage system to be connected is ETERNUS DX60/DX80/DX90, and the firmware version is V10L30 or later, use ETERNUS Web GUI to check that the Maintenance connection is enabled in Setup Network Environment.

The screenshot shows the ETERNUS Web GUI interface. The top navigation bar includes tabs for Status, Easy Setup, Volume Settings, Global Settings, Maintenance, and Diagnosis. The 'Global Settings' tab is active, and the 'Network Settings' menu is open, showing options like Setup Network Environment, Setup SNMP Agent, Download MIB File, Perform SNMP Trap Test, Setup E-Mail Notification, Display SMTP Log, and Renew SSL Certificate. The 'Setup Network Environment' option is selected. Below the menu, the 'Interface' section is visible, showing fields for Speed and Duplex (Auto Negotiation), Master CM IP Address, Slave CM IP Address, Subnet Mask, Default Gateway, Primary DNS, and Secondary DNS. The 'Maintenance' checkbox is checked and circled in red.

Field	Value
Speed and Duplex	Auto Negotiation
Master CM IP Address	Box . Box . Box . Box
Slave CM IP Address	0 . 0 . 0 . 0
Subnet Mask	255 . 255 . 255 . 0
Default Gateway	Box . Box . Box . Box
Primary DNS	Box . Box . Box . Box
Secondary DNS	0 . 0 . 0 . 0
http	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
https	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
telnet	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
SSH	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Maintenance	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Maintenance Secure	<input checked="" type="radio"/> Enable <input type="radio"/> Disable

3.2.2 Setting-up the Storage System Host Interface

For a fibre channel, SAS or iSCSI host interface connection between the server and storage system, first perform the following storage system host interface settings, and then connect to the server. Use ETERNUS Web GUI to perform the settings.

■ For Fibre Channel

Perform CA detailed settings and Fibre Channel Switch settings, and then connect to the server.



Note

- For CA detailed settings, refer to "Server Connection Guide (Fibre Channel) for Windows®" provided with the storage system.
- For Fibre Channel Switch settings, refer to "Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings".

■ For SAS

Storage system settings are not required.

■ For iSCSI

- Set the IP address and subnet mask of the port.
- Set the iSCSI name and IP address of the server.
- When using CHAP Authentication, perform the settings for CHAP authentication.
- For a multipath connection, set the unique iSCSI names for each port.

The screenshot shows the ETERNUS Web GUI interface. The top navigation bar includes tabs for Status, Easy Setup, Volume Settings, Global Settings (selected), Maintenance, Diagnosis, and Utilities. Under Global Settings, there are sub-tabs for User Management, Network Settings, Remote Support, System Settings, and Host I/F Management (selected). The 'Setup iSCSI Host' page is displayed, featuring a 'Notice' section with a warning icon and text: 'If any information regarding active hosts is being modified or deleted please stop any access from the corresponding host.' Below this is a 'Registered iSCSI Host List' table with columns for Name, iSCSI Name, IP Address, and Host Response. At the bottom, the 'Add New iSCSI Host' form is shown, with fields for iSCSI Port (CM#0 Port#0), iSCSI Name (with a 'Discover' button), IP Address (with a 'Discover' button), Name, and Host Response (0:Default). The 'iSCSI Name' and 'IP Address' fields are circled in red.

Set the iSCSI name and IP address using ETERNUS Web GUI as shown in the figure above.



Note

- After completing each of the above settings, connect to the server, and then log on to the Target with the server Microsoft iSCSI Software Initiator.
- For details about settings procedure or Microsoft iSCSI Software Initiator settings, refer to "Server Connection Guide (iSCSI)".

3.3 Installation

3.3.1 Running the VDSHP Installer

- Double click the VDSHP package (ETERNUS_VDSHP.msi) to run the installation wizard. Install VDSHP according to the directions that appear on-screen.
- If the older version of VDSHP is already installed, it is replaced by the new version (the older version is overwritten with new version). The following table shows the relationship between prior VDSHP versions and carry over parameters.

Carry over parameters	Prior VDSHP version			Remarks
	1.0.0 to 1.0.1	1.0.2 to 1.0.4	1.1.0 or later	
<ul style="list-style-type: none">• ETERNUS Disk storage system IP address and password	Lost	Retained	Retained	For version 1.0.2 to 1.0.4, LAN must be connected.
<ul style="list-style-type: none">• Host I/F Type• Auto-Delete RLU• Default RAID Type• Default Number of Disk Drive used for RLU• Protected LUN List	—	—	Retained	For version 1.0.0 to 1.0.4, the host interface type is set to Fibre Channel after reinstallation.



Note

If the prior VDSHP version is 1.0.4 or older, the host interface type is set to "Fibre Channel" after reinstallation. Although the ETERNUS Disk storage system IP address and password are retained, the host interface type is changed. If VDSHP version 1.0.4 or older is overwritten with new version, and if using a SAS or iSCSI connection, the host interface type setting will need to be changed. Refer to ["7.3.2 Changing the Host I/F Type" \(page 37\)](#) for detailed procedures.

- By default, the "Install for the following users" setting displayed during the installation is set to "Everyone", and this setting should not be changed.
- The default folder for installation varies depending on whether the OS type is 32bit or 64bit.
For 32bit OS: C:\Program Files\ETERNUS VDS Hardware Provider
For 64bit OS: C:\Program Files (x86)\ETERNUS VDS Hardware Provider

3.3.2 Setting the Storage System IP Address

VDSHP requires setup of the IP address and password of the storage system that is to be controlled. Refer to "[Chapter 7 VDSHP Configuration Tool \(F3GLVdFa.exe\)](#)" (page 33) for setup procedures. IP address and password can be added and changed later.
This completes the installation process.

3.4 Uninstallation

3.4.1 Uninstalling VDSHP

The procedure for VDSHP uninstallation is as follows.

Procedure

- 1 If the Storage Manager for SANs, DiskRAID, Computer Management, Disk Management, or VDSHP Configuration Tool (F3GLVdFa.exe) is running, exit it.
- 2 Select "ETERNUS VDS Hardware Provider x.x.x" from the [Add or Remove Programs] menu, and click the [Remove] button to perform uninstallation.

End of procedure

Chapter 4 Functions

4.1 Host Interface Selection

VDSHP supports three types of storage system host interface: Fibre Channel, SAS, and iSCSI. In Windows Server 2008 R2, all three types can be used concurrently. However, for Windows Server 2003 and Windows Server 2008, only one host interface type can be used at a time. VDSHP provides the function to select the host interface to be used, for Windows Server 2003 and Windows Server 2008. Refer to ["7.3.2 Changing the Host I/F Type" \(page 37\)](#) for the setting procedure.

4.2 LUN Protection

VDSHP provides a function to prevent LUN from being deleted. Refer to ["7.3.7 Viewing the Protected LUN List" \(page 40\)](#) for the setting procedure.

4.3 Usable DiskRAID Commands

The following commands can be used for DiskRAID. If other commands are used, an error occurs.

- AUTOMAGIC
- CHAP
- CREATE
- DELETE
- DETAIL
- EXIT
- EXTEND
- HELP
- LIST
- MAINTENANCE
- NAME
- REENUMERATE
- REFRESH
- REM
- SELECT
- SETFLAG
- UNMASK

Chapter 5 Information Displayed by Storage Manager for SANs / DiskRAID

Storage Manager for SANs and DiskRAID display a variety of storage system related information, with the following being displayed for each member:

Member	Information Displayed
Sub System Name	If sub system names have been assigned for the storage system, these are displayed. Otherwise, the sub system names are displayed using a "Model Name_Product ID" format.
Sub SystemCapacity (*1)	The total capacity of target drives in the storage system is displayed. Capacity in drives not targeted for display is not included.
Controller	CM port status is displayed. This is not displayed for iSCSI by Storage Manager for SANs
Controller Name (*2)	Displayed using a "CM_xx" format. "xx" indicates the Controller Module number.
Port Name (*2)	Port names are displayed in the following format:: <ul style="list-style-type: none"> • ETERNUS DX60/DX80/DX90 and ETERNUS2000: "CMxx_Chipzz_Portvv" • ETERNUS DX400/DX8000 series, ETERNUS4000, and ETERNUS8000: "CMxx_CAyy_Chipzz_Portvv" "xx" indicates the Controller Module number. "yy" indicates the Channel Adapter number. "zz" indicates the Processor number. "vv" indicates the port number.
Drive Name	Displayed using a "DExx_SLOTyy" format. "xx" indicates the enclosure (*4) number. "yy" indicates the slot number within the enclosure.
Drive Bus Number	The enclosure (*4) number for the enclosure containing the drive is displayed, in hexadecimal.
Drive Slot Number	The slot number of the drive installation position within the enclosure containing the drive is displayed, in hexadecimal.
Target	For storage system iSCSI ports, the iSCSI name and alias names are displayed.
Portal	For storage system iSCSI ports, the IP address is displayed.
LUN Name	If LUN names have been assigned for the storage system, these are displayed. Otherwise, the LUN names are displayed in the "LVxxxx" format. "xxxx" indicates the storage system LUN (Logical Volume) number.
LUN Number (*3)	Storage Manager for SANs displays the LUN numbers of logical volumes in the storage system, and DiskRAID displays the numbers that it has assigned.
Enclosures (*2) (*3)	The number of enclosures (*4) in the storage system is displayed.
Enclosure number (*2) (*3)	The number of the enclosure (*4) in which the drive is installed.

Member	Information Displayed
Spindle speed (*2) (*3)	The drive rotation rate is displayed in RPM.
Free space (*2) (*3)	This is displayed as Primordial Pool.
RAID Group (*2) (*3)	This is displayed as Concrete Pool.

*1: Not displayed for DiskRAID

*2: Not displayed for Storage Manager for SANs

*3: Not displayed for Windows Server 2003 and Windows Server 2008.

*4: Enclosure refers to a Controller Enclosure (CE), or a Drive Enclosure (DE).

5.1 Invisible Components

Of the various components of the storage system, the following are not displayed by the Storage Manager for SANs and DiskRAID. These components cannot be controlled by the Storage Manager for SANs and DiskRAID either.

Type	Invisible Component
Port	<ul style="list-style-type: none"> • ETERNUS DX400 series and ETERNUS4000 iSCSI port • ETERNUS DX8000 series and ETERNUS8000 iSCSI port • RA port • OCLINK port • FCLINK port
Drive	<ul style="list-style-type: none"> • ETERNUS DX8000 series or ETERNUS8000 system disks and unused drives installed in the system disks slots • Drives used for RAID0 level RAID groups • Drives used for RAID5+0 level RAID groups • Drives used for RAID groups with Main Frame Logical Volumes (MLU or MVV) • Drives used for RAID groups whose DVCF mode is ON • Drives used for Thin Provisioning Pools
LUN	<ul style="list-style-type: none"> • RAID0 Logical Volumes • RAID5+0 Logical Volumes • Mixed RAID level Logical Volumes • SDV, SDPV, MLU, or MVV type LUN (LUNs other than OLU) • Thin Provisioning Pool Logical Volumes

Chapter 6 Configuration Setup

6.1 LUN Creation

Creating LUNs in the storage system.

LUNs are created in the storage system on RAID groups configured from multiple disk drives. Therefore, in order to create the LUNs, VDSHP will first create any RAID groups needed.

When VDSHP creates a RAID group, it is automatically associated with an Assigned CM. If the Assigned CM needs to be changed, ETERNUS Web GUI should be used.

6.1.1 Auto-Generating LUN Names

■ When the User Specifies a LUN Name

Depending on the storage system type, if the specified LUN name is already in use within the storage system, an "_x" or similar may be automatically appended by VDSHP to prevent name duplication. The following table shows the correlation between storage system type and the automatic appending of characters to duplicate LUN names by VDSHP.

Storage System	Duplicate LUN names
ETERNUS DX series ETERNUS4000 models 400 and 600 (V20L30 or later) ETERNUS8000 models 800, 1200, and 2200 (V20L30 or later)	Have an "_x" or similar automatically appended
All Other Types	Do not have an "_x" or similar automatically appended

■ When the User Does Not Specify a LUN Name

Depending on the storage system type, a LUN name may be automatically generated by VDSHP. The following table shows the correlation between storage system type and auto-generation of LUN names by VDSHP.

Storage System	Auto-generated name
ETERNUS DX series ETERNUS4000 models 400 and 600 (V20L30 or later) ETERNUS8000 models 800, 1200, and 2200 (V20L30 or later)	"VDS_XXXXX"
All Other Types	Name is not generated

("XXXXX" is a number generated following the order of LUN creation.)

6.1.2 LUN Types and RAID Levels

The following table shows the correlation between LUNs created by Storage Manager for SANs or DiskRAID and RAID level created by VDSHP.

Storage Manager for SANs LUN Type	DiskRAID LUN Type	Storage System RAID Level
Mirrored	Mirror	RAID1
Striped	Stripe	RAID1+0
Striped with parity	RAID	RAID5
Spanned	Span	RAID6

The table above shows the correlation defined by ETERNUS VDSHP. Generally, "Stripe" indicates RAID0, and "Span" indicates JBOD. However, for the ETERNUS VDSHP use environment, LUNs of RAID10 (RAID1+0) for "Stripe", and LUNs of RAID6 for "Span" are created.

6.1.3 Minimum LUN Sizes

Specified values less than 1GB are treated as being 1GB.

6.1.4 Specifying Drives and Creating RAID Groups

There are two methods for creating a Logical Volume, depending on whether user specifies the disk drive. When VDSHP accepts the Logical Volume creation request, check whether the disk drive is specified, and the usage of disk drives and RAID groups in the ETERNUS Disk storage system, and then create a Logical Volume in an existing RAID group or newly-created RAID group.

Disk Drives Are	State of disk drives & RAID groups	Logical Volume Creation Method
User specified	When the specified disk drives contain one or more RAID groups.	The Logical Volume is created in the free area of the specified disk drives outside the existing RAID groups.
	When none of the specified disk drives are in use yet.	A new RAID group is created on the specified disk drives and then the Logical Volume is created.
Not specified	When an existing RAID group has both the specified RAID level and free area of at least the specified size.	The Logical Volume is created in the free area of that RAID group.
	When no existing RAID group has both the specified RAID level and free area of at least the specified size.	VDSHP automatically selects the disk drives, creates a RAID group on them and then the Logical Volume.



Note

Disk drives cannot be specified when using Storage Manager for SANs.

The following conditions apply when creating RAID groups.

■ When the User Specifies Disk Drives

When user specifies disk drives, the relevant disk drives must meet the following requirements for number of disk drives, installation location, and disk drive type.

- Disk Drive Quantity Requirement

The number of disk drives used for each RAID group in the storage system must meet the following requirements:

RAID Level	ETERNUS DX60 ETERNUS DX80 ETERNUS DX90 ETERNUS2000	ETERNUS DX410 ETERNUS DX440 ETERNUS4000	ETERNUS DX8100 ETERNUS DX8400 ETERNUS DX8700 ETERNUS8000
RAID1	2(1+1)		
RAID1+0	4(2+2) to 32(16+16)		
RAID5	3(2+1) to 16(15+1)		4(3+1) or 8(7+1)
RAID6	5(3+2) to 16(14+2)		8(6+2) or 16(14+2)

- Disk Drive Location Requirement

There are no restrictions on the installation location of disk drives in the ETERNUS DX60/ DX80, and ETERNUS2000. For the ETERNUS4000 and ETERNUS8000, the installation location of disk drives must meet the following requirements:

RAID Level	ETERNUS DX410 ETERNUS DX440 ETERNUS DX8100 ETERNUS4000 all models ETERNUS8000 model 700 ETERNUS8000 model 800	ETERNUS DX8400 ETERNUS DX8700 ETERNUS8000 model 900 ETERNUS8000 model 1100 ETERNUS8000 model 1200 ETERNUS8000 model 2100 ETERNUS8000 model 2200
RAID1	Mirrored disk drives may NOT have the same last 5 bits in their DE number.	
RAID1+0	Mirrored disk drives may NOT have the same last 5 bits in their DE number.	
RAID5	(No installation location requirements)	All disk drives must have a different last 5 bits in their DE number.
RAID6	(No installation location requirements)	No more than two disk drives may have the same last 5 bits in their DE number.

- Disk Drive Type Requirement

Disk drive type (FC, SATA, SAS, or SSD) to be specified must be the same.

■ When the User does not Specify Disk Drives

When the user does not specify any disk drives, VDSHP automatically selects disk drives to create a RAID group that meets the following requirements for number of disk drives, installation locations, capacity, and type. If there are insufficient disk drives to satisfy these conditions, an error will occur.

If a RAID level cannot be created due to a lack of free disk drives, Storage Manager for SANs either does not display the relevant RAID level in the LUN creation list, or displays "0" as the available LUN size.

- Disk Drive Quantity Requirement

By default, VDSHP creates a RAID group with the minimum number of RAID levels for each storage system. The number of disk drives can be changed with the VDSHP configuration tool. Refer to "[Chapter 7 VDSHP Configuration Tool \(F3GLVdFa.exe\)](#)" (page 33) for setting procedures. The following table shows the minimum number of disk drives for each RAID level.

RAID Level	ETERNUS DX60 ETERNUS DX80 ETERNUS DX90 ETERNUS2000	ETERNUS DX410 ETERNUS DX440 ETERNUS4000	ETERNUS DX8100 ETERNUS DX8400 ETERNUS DX8700 ETERNUS8000
RAID1	2(1+1)	2(1+1)	2(1+1)
RAID1+0	4(2+2)	4(2+2)	4(2+2)
RAID5	3(2+1)	3(2+1)	4(3+1)
RAID6	5(3+2)	5(3+2)	8(6+2)

- Disk Drive Location Requirement

There are no restrictions on the installation location of disk drives in the ETERNUS DX60/ DX80, and ETERNUS2000. For the ETERNUS4000 and ETERNUS8000, the installation location of disk drives must meet the following requirements:

RAID Level	ETERNUS DX410 ETERNUS DX440 ETERNUS DX8100 ETERNUS4000 all models ETERNUS8000 model 700 ETERNUS8000 model 800	ETERNUS DX8400 ETERNUS DX8700 ETERNUS8000 model 900 ETERNUS8000 model 1100 ETERNUS8000 model 1200 ETERNUS8000 model 2100 ETERNUS8000 model 2200
RAID1	Mirrored disk drives may NOT have the same last 5 bits in their DE number.	
RAID1+0	Mirrored disk drives may NOT have the same last 5 bits in their DE number.	
RAID5	(No installation location requirements)	All disk drives must have a different last 5 bits in their DE number.
RAID6	(No installation location requirements)	No more than two disk drives may have the same last 5 bits in their DE number.

- Capacity Requirement

VDSHP selects disk drives with the same capacity.

- Disk Drive Type Requirement

VDSHP selects disk drives with the same disk drive type (FC, SATA, SAS, or SSD).

6.2 LUN Expansion

Use of the storage system's LUN Concatenation function allows other free area to be concatenated onto a LUN to increase its size.

6.2.1 Concatenation Limit

The free area being concatenated should be in the same RAID group as the LUN they are being concatenated onto.

Only one area can be concatenated at a time. Up to 16 areas (including the base LUN) can be concatenated.

6.2.2 Expandable LUNs and Minimum Size

Only LUNs whose size is 1GB or more before concatenation can be expanded.

If specified the expansion size smaller than 1GB, it is treated as 1GB LUN.

6.2.3 Specifying Drives and Concatenation Areas

There are two methods to expand LUN depending on whether the user specifies disk drives. When VDSHP accepts the LUN expansion request, check whether the disk drive is specified and the conditions of disk drives and RAID groups in the storage system, and whether VDSHP can use the expansion in the existing RAID group or if a new RAID group must be created before expanding the LUNs.

Disk Drive Specification by user	Usage of disk drives and RAID groups	Area to be used for LUN Concatenation
Specified	When all the specified disk drives are configuring one RAID group.	Free area of the existing RAID group in the specified disk drive is concatenated.
	None of the specified disk drives are in use yet.	A new RAID group is created in the specified disk drives and the free area is used.
Not specified	There is free area larger than the specified size in the RAID group where the LUN to be expanded exists.	Free area of that RAID group is used.
	There is no free area larger than the specified size in the RAID group where the LUN to be expanded exists.	VDSHP selects disk drives, creates a RAID group and uses the free area.



Note

Disk drives cannot be specified when using Storage Manager for SANs.

VDSHP disk drive specification and selection conditions are the same as when creating Logical Volumes. However, for ETERNUS DX series, ETERNUS2000, ETERNUS4000 models 400 and 600, ETERNUS8000 models 800, 1200, and 2200 the following conditions are also required.

■ When a User Specifies Disk Drives

- Requirements for the Disk Drive Type
Disk drive type (FC, SATA, SAS, or SSD) must be the same as the disk drives configured in the RAID group to be expanded.

■ When a User does not Specify Disk Drives

- Requirements for the Disk Drive Type
Disk drive type (FC, SATA, SAS, or SSD) to be specified must be the same as the disk drives configured in the RAID group to be expanded.

6.3 LUN Assignment and Unassignment

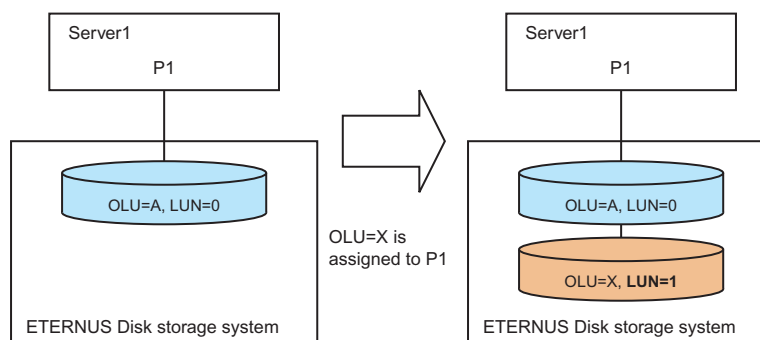
Assigning a LUN allows it to be seen from a server. The Unassigning function undoes this setting.

6.3.1 Assigning LUN Numbers

When assigning a LUN, VDSHP automatically assigns a LUN number to identify the LUN on the server. VDSHP assigns the smallest assignable LUN number. If the identification information ^{(*)1} of multiple HBAs is specified, the same LUN number is assigned to all specified HBAs.

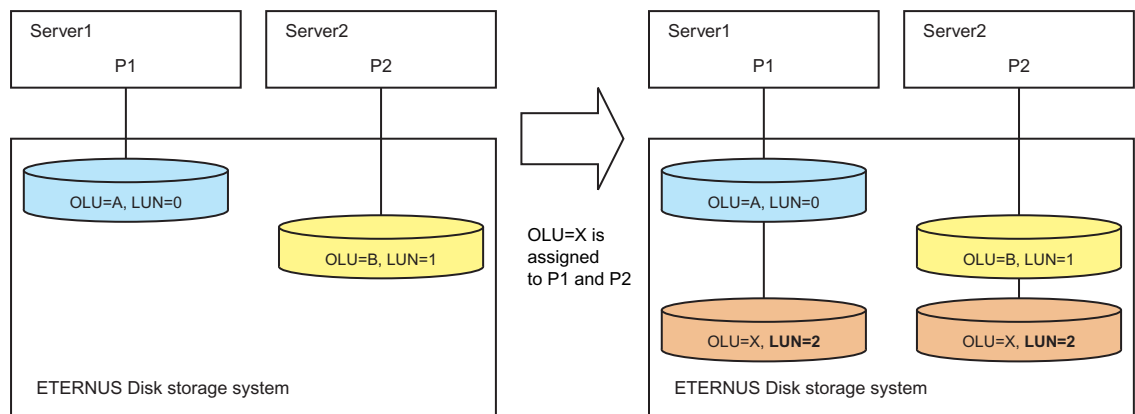
*1: WWN for Fibre Channel, SAS address for SAS, iSCSI address for iSCSI

■ Operation example 1



When OLU=A has been assigned to P1 as LUN 0, LUN 1 assigned to OLU=X when OLU=X is assigned to P1.

■ Operation example 2



When OLU=A has been assigned to P1 as LUN 0 and OLU=B to P2 as LUN 1, LUN 2 is assigned to OLU=X when OLU=X is assigned to P1 and P2.

6.3.2 Duplicating Affinity Groups

When the ports (WWN/iSCSI name) that are specified to assign LUNs and ports that are not specified are using the same Affinity Group, VDSHP duplicates the Affinity Group and assigns LUNs using the duplicate Affinity Group. The original Affinity Group name + "_nnn" will be assigned to the duplicate Affinity Group as its name. When the name exceeds the maximum number of characters, the original Affinity Group name is deleted from the last character and "_nnn" is added.

6.3.3 Assigning LUN Numbers for Multipaths

When using multipath connection, assign the LUN number using the following procedure.

Procedure

- 1 Check that a multipath driver is installed in the server.
- 2 Connect the server to the storage system via multipaths.
- 3 Specify the identification information ^(*) for each HBA among multipaths at the same time to assign LUNs.

*1: WWN for Fibre Channel, SAS address for SAS, iSCSI address for iSCSI

End of procedure

6.3.4 Assigning LUN Numbers for Cluster Environments

When configuring the Microsoft Cluster Service (MSCS) or Windows Server Failover Cluster (WSFC), specify each HBA for each node at the same time and assign the LUNs.

6.3.5 Recognizing LUNs

Even after assigning LUNs or releasing assigned LUNs while Windows is running, LUN recognition of Windows may not be changed automatically. If LUN recognition is not correct, the server must be rebooted.

6.4 LUN Deletion

Deleting specified LUNs.

6.4.1 Auto-deleting RAID Groups

To delete the RAID group or not can be selected by the VDSHP setting when the entire RAID group is to be unused as a result of LUN deletion. RAID groups are deleted in the default setting. For details of this setting, refer to ["Chapter 7 VDSHP Configuration Tool \(F3GLVdFa.exe\)" \(page 33\)](#).

6.5 Hot Spare Assignment and Unassignment

Assigning and unassigning a hot spare by specifying LUNs or drives.

6.5.1 Assigning by LUN Specification

A hot spare can be assigned by specifying LUNs using the DiskRAID AUTOMAGIC command. A Dedicated Hot Spare is assigned for ETERNUS DX60/DX80/DX90 and a Global Hot Spare is assigned for any other storage system.
Hot spare assignment using the AUTOMAGIC command is supported only by Windows Server 2008 R2.

6.5.2 Assigning and Unassigning by Drive Specification

A hot spare can be assigned and unassigned by specifying drives using the DiskRAID SETFLAG command.

Of all hot spare types only Global Hot Spare can be assigned and unassigned using the DiskRAID SETFLAG command in all ETERNUS Disk storage systems.

Hot spare assignment using the SETFLAG command is supported by Windows Server 2003, Windows Server 2008, and Windows Server 2008 R2.



Note

A Dedicated Hot Spare cannot be unassigned using the SETFLAG command. Use ETERNUS Web GUI to unassign a Dedicated Hot Spare.

6.5.3 Deleting RAID Groups and Unassigning the Dedicated Hot Spare Status

When all LUNs are deleted from a RAID group, the RAID group is automatically deleted depending on the VDSHP settings. When the RAID group is deleted, the drive specified as the Dedicated Hot Spare drive for the RAID group is unassigned.

6.6 Storage Pool

Displaying the Storage Pool.

The Storage Pool can be displayed using the DiskRAID LIST or DETAIL command.

Primordial Pool represents free space in the storage system and Concrete Pool represents RAID groups.

The Storage Pool can be displayed only in Windows Server 2008 R2.

6.7 Drive LED Blinking

The LEDs of a specified drive can be made to blink.

6.7.1 Supported Storage Systems

This function is supported in the following storage systems.

- ETERNUS DX60, firmware V10L30 or later
- ETERNUS DX80, firmware V10L30 or later
- ETERNUS DX90, firmware V10L30 or later

6.7.2 Operation Method

- Storage Manager for SANs

Select "Blink Drive Light".

- DiskRAID

Enter "MAINTENANCE DRIVE BLINK". If COUNT=X is specified, the LED blinks for "X" seconds.

Only DRIVE is an object (device) which can be specified in MAINTENANCE command, and only BLINK may be specified as an operation.

Chapter 7 VDSHP Configuration Tool (F3GLVdFa.exe)

7.1 Configuration Tool Startup

Start the configuration tool using the following procedure.

Procedure

- 1 If the Storage Manager for SANs, DiskRAID, Computer Management, Disk Management, ETERNUS Web GUI, or storage management software such as ETERNUS SF Storage Cruiser is running, exit it.
- 2 Display command prompt, and move the current directory to the VDSHP installed directory.
For 32bit OS: C:\Program Files\ETERNUS VDS Hardware Provider
For 64bit OS: C:\Program Files (x86)\ETERNUS VDS Hardware Provider
- 3 Input "F3GLVdFa.exe /config". The console window opens, and the Main Menu appears.

End of procedure

7.2 Main Menu Details

```
-- ETERNUS VDSHP Configuration Tool --  
1. Set Storage System IP Address. (1)  
    [ Not Registered. ]  
2. Change Host I/F Type. (2)  
    [ iSCSI ]  
3. Change Auto-Delete RLU. (3)  
    [ DISABLE ]  
4. Change Default RAID Type. (4)  
    [ MIRROR ]  
5. Change Default Number of Disk Drive used for RLU. (5)  
6. View Connected Storage System IDs (IP/Model_Serial-No.). (6)  
7. View Protected LUN List (Model_Serial-No./Lun-V). (7)  
8. Force Unlock Storage System. (8)  
0. Exit this Tool. (9)  
-----  
Input Command Number (0-8). > (10)
```

(1) Sets the IP address for the VDSHP connecting storage system.

- For ETERNUS DX60/DX80/DX90
The root privilege password or Standard privilege user name and password are required.
- For ETERNUS DX410/DX440/DX8100/DX8400/DX8700, ETERNUS4000 models 400 and 600 with V20L30 or later firmware, and ETERNUS8000 models 800, 1200, and 2200 with V20L30 or later firmware
An administrator-level role user name and password are required.
- For storage systems other than above storage systems
The root privilege password is required.
The registered storage system IP address is displayed in [] (brackets).

(2) Sets the host interface type for the VDSHP connecting storage system.

The registered storage system host interface type is displayed in [] (brackets).

FC	Supports Fibre Channel connection
SAS	Supports SAS connection
iSCSI	Supports iSCSI connection
HYBRID	Supports Fibre Channel/SAS/iSCSI

- For Windows Server 2003 or Windows Server 2008
The default setting is [FC]. This setting can be changed to either FC, SAS, or iSCSI.

- For Windows Server 2008 R2
Usually, [HYBRID] is displayed. This setting cannot be changed. It is displayed in the menu as follows.

2. Host I/F Type is Fixed. Can Not Change Host I/F Type.
[HYBRID]

- (3) Sets whether to delete the RAID group when the entire RAID group is to be unused as a result of LUN deletion.

The current setting is displayed in [] (brackets).

ENABLE	Deletes RAID Group
DISABLE	Does not delete RAID Group

The default setting is [ENABLE].

- (4) Sets the RAID Type when "Default" is selected as the RAID Type for LUN creation.
The current setting is displayed in [] (brackets)

MIRROR	Creates LUN with RAID1 configuration
STRIPE	Creates LUN with RAID10 configuration
PARITY	Creates LUN with RAID5 configuration
SPAN	Creates LUN with RAID6 configuration

The default setting is [MIRROR].

- (5) Sets the number of disk drives configuring the RAID group when creating a RAID group, but no disk drive is specified in the storage system. Since the Storage Manager for SANs cannot select the disk drive to create LUN, for creating large capacity LUN with Storage Manager for SANs, add the number of disk drives configuring LUN using this function.
- (6) Displays the IP address and "Model name_Serial No." for all the registered storage systems.
- (7) Displays a list of LUN that are prevented from being deleted.
- (8) Forcibly releases the exclusive status of the storage system. Storage systems with registered IP address can be released.
- (9) Exits the Configuration Tool.
- (10) Input prompt

7.3 Setup Confirmation and Modification

To display the setting screen, input the value ("1" to "8") corresponding to each setting menu in the Main Menu.

7.3.1 Setting the ETERNUS IP Address

Before setting the IP address for the storage system, perform LAN settings for the storage system and the server, and connect the LAN cables.

-<< Set Storage System IP Address >>	
-- Registered IP --	
Not Registered.	(1)

Input Storage System IP Address. > 10.10.10.10	(2)
Input Storage System User Name. > xxxx	(3)
Input Storage System password. >****	(4)
Successfully Set.	(5)
Press the ENTER key to return to the Main Menu.	(6)

- (1) Registered IP addresses are displayed.
- (2) Input the IP address of the storage system to be registered in "xxx.xxx.xxx.xxx" format.
If an already registered IP address is entered, the password can be changed or deleted.
- (3) This line is displayed only for ETERNUS DX series, ETERNUS4000 model 400 or 600 (V20L30 or later), and ETERNUS8000 model 800, 1200, or 2200 (V20L30 or later).
Input the storage system name to be registered.
- (4) Input the root privilege password or the password corresponding to the user name input in Step (3) for the storage system to be registered.
- (5) After the process is completed successfully, the message "Successfully Set." appears.
- (6) Press the ENTER key to return to the Main Menu.

7.3.2 Changing the Host I/F Type

```
<< Change Host I/F Type >>
1. Set FC      Type.
2. Set SAS     Type.
3. Set iSCSI   Type.
0. Return to Main Menu.
Input Command Number (0-3). > 1      (1)
Host I/F Type Changed.                (2)
Press the ENTER key to return to the Main Menu. (3)
```

(1) Input host interface type.

(2) After the process is completed successfully, the message "Host I/F Type Changed." appears.

(3) Press the ENTER key to return to the Main Menu.



Note

For Windows Server 2008 R2, setting is not required because the host interface is fixed.

7.3.3 Changing the Auto-Delete RLU

```
<< Change Auto-Delete RLU >>
1. ENABLE Auto-Delete RLU.
2. DISABLE Auto-Delete RLU.
0. Return to Main Menu.
Input Command Number (0-2). > 1      (1)
Auto-Delete RLU Setting Changed.      (2)
Press the ENTER key to return to the Main Menu. (3)
```

(1) Input "1" (enable RLU auto-deletion) or "2" (disable RLU auto-deletion).

(2) After the process is completed successfully, the message "Auto-Delete RLU Setting Changed." appears.

(3) Press the ENTER key to return to the Main Menu.

7.3.4 Changing the Default RAID Type

```
<< Change Default RAID Type >>
  1. Set MIRROR (RAID1).
  2. Set STRIPE (RAID10).
  3. Set PARITY (RAID5).
  4. Set SPAN (RAID6).
  0. Return to Main Menu.
Input Command Number (0-4). > 3 (1)
Default RAID Type Changed. (2)
Press the ENTER key to return to the Main Menu. (3)
```

(1) Input the value corresponding to the RAID level when specifying "Default".

(2) After the process is completed successfully, the message "Default RAID Type Changed." appears.

(3) Press the ENTER key to return to the Main Menu.

When "CREATE LUN AUTOMAGIC" is selected for the DiskRAID command, VDSHP recognizes that the "Default" is specified.

Note that "Default" setting is not available for Storage Manager for SANs.

7.3.5 Changing the Default Number of Disk Drives for RLU

```
<< Change Default Number of Disk Drive used for RLU >>
Input Storage System IP Address.  > 10.10.10.10
[ Configured Default Number of Disk Drive ]
RLU Type(RAID) | Valid Range | Initial | Current |
-----+-----+-----+-----+
MIRROR (RAID1) | 2          | 2      | 2      |
STRIPE (RAID10)| 4 - 32     | 4      | 4      |
PARITY (RAID5) | 3 - 16     | 3      | 3      |
SPAN (RAID6)   | 5 - 16     | 5      | 5      |
-----+-----+-----+-----+

1.Change Default Number for MIRROR (RAID1).
2.Change Default Number for STRIPE (RAID10).
3.Change Default Number for PARITY (RAID5).
4.Change Default Number for SPAN (RAID6).
0.Return to Main Menu.
Input Command Number(0-4).  > 2
Input Number of Disk Drive.  > 8
Default Number of Disk Drive Changed.
Press the ENTER key.
```

- (1) Input the IP address for the storage system to be changed.
- (2) The number of disk drives used for each RAID Type of the specified storage system is displayed.

Valid Range	Available number of disk drives
Initial	Number of disk drives in the initial status
Current	Current settings
- (3) Input the RAID Type to change the default number of disk drives.
- (4) Input the new settings for the number of disk drives. Make sure to input the value between the range displayed in the (2) Valid Range.
- (5) After the process is completed successfully, the message "Default Number of Disk Drive Changed." appears.
- (6) Press the ENTER key to display the sub menu again.

7.3.6 Viewing the Connected ETERNUS IDs

```
<< View Connected Storage System IDs (IP/Model_Serial-No.) >>
IP address      | Storage System ID (Model_Serial-No.)
-----+-----
10.10.10.10     | E205F4A_000001
10.10.10.20     | Not connected.
-----+-----
Press the ENTER key to return to the Main Menu.
```

(1) (2)

- (1) Registered storage system IP address and ID information is displayed.
 If the target storage system is not connected or a communication error occurs, the message "Not connected." appears.
- (2) Press the ENTER key to return to the Main Menu.

7.3.7 Viewing the Protected LUN List

```
<< View Protected LUN List (Model_Serial-No./Lun-V) >>
Storage System ID (Model_Serial-No.) | LUN-V
-----+-----
E205F4A_000001                       | 0x0000
E205F4A_000001                       | 0x0123
E205F4A_000001                       | 0x123a
-----+-----
Press the ENTER key to return to the Main Menu.
```

(1) (2)

- (1) The list of ID information for storage system and LUN-V number for LUN that is prevented from being deleted is displayed.
- (2) Press the ENTER key to return to the Main Menu.
- If deletion is requested for LUNs displayed in this menu from the Storage Manager for SANs or DiskRAID, VDSHP protects LUNs from being deleted. Use this function to prevent LUNs from being accidentally deleted.
 - Note that target LUN cannot be specified using this configuration tool. Directly edit the registry and specify the target LUN as described below. Registry keys are different for the 32bit OS and 64bit OS.
 For 32bit OS:
 HKEY_LOCAL_MACHINE\SOFTWARE\Fujitsu\F3GLVdFa\Parameters\ProtectedLun
 For 64bit OS:
 HKEY_LOCAL_MACHINE\Software\WOW6432Node\Fujitsu\F3GLVdFa\Parameters\ProtectedLun

Value name:

Input Storage System ID. Storage System ID is displayed in "View Connected ETERNUS IDs (IP/Model_Serial-No.)" menu.

Format: Select REG_MULTI_SZ (multiple character strings value).

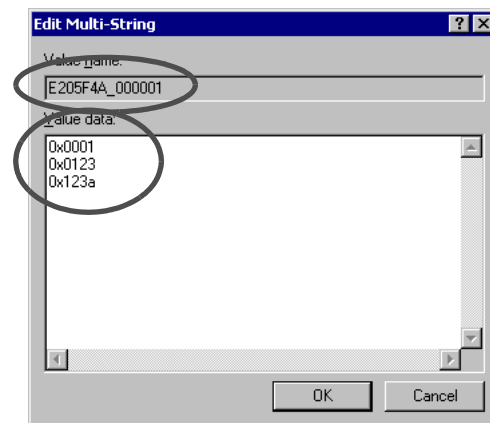
Value: Input LUN-V number (Logical Volume Number) in "0xXXXX" format. Put "0x" in head of the number and input fixed 4-byte hexadecimal number. Start a new line for each LUN-V number.

Example:

0x0000

0x0123

0x123a



- If the LUN-V number is specified in an incorrect format, the input value is ignored.
- Specify LUN with LUN-V numbers managed by the storage system rather than HLU, as the LUN number can be checked from the host.

Note

- VDSHP refers to the registry in the server where VDSHP is operating. When using this function, it is recommended to perform the registry setting for all the servers installing VDSHP.
- This function is not available for the storage management software that is not use VDSHP such as ETERNUS Web GUI.
- Delete the relevant LUN from the registry before unassigning a LUN. If unassigning is requested for the reregistered LUN, VDSHP reports nothing.
- Delete the relevant LUN from the registry before assigning a LUN. If not, actual LUN mapping may be different form the expected setting.

7.3.8 Force Unlocking the ETERNUS

IMPORTANT Confirm that other storage management software such as ETERNUS Web GUI or ETERNUS SF Storage Cruiser is not operating in the storage system to release the exclusion in advance. If using this function while these software are operating, configuration in the storage system becomes corrupt and may cause customer data loss. Make sure to stop the software and then use this function.

```
<< Force Unlock Storage System>>
Input Storage System IP Address. > 10.10.10.10 (1)
Input Storage System User Name. > xxxx (2)
Input Storage System Password. > **** (3)
The Storage System is in use by other TOOL.
IP Address Holding Lock: 10.10.10.250 (4)
Force Unlock Storage System Control? (1:YES 2:NO) > 1 (5)
The Storage System Force Unlocked. (6)
Press the ENTER key to return to the Main Menu. (7)
```

- (1) Input registered IP address for the storage system to be forcibly released the exclusion. If an unregistered IP address is entered, an error occurs.
- (2) This line is displayed only for ETERNUS DX series, ETERNUS4000 model 400 or 600 (V20L30 or later), and ETERNUS8000 model 800, 1200, or 2200 (V20L30 or later).
Input the storage system name to be registered.
- (3) Input the root privilege password or the password corresponding to the user name input in Step (2) for the storage system.
- (4) One of the following messages is displayed according to the storage system status.
 - "The Storage System is not Locked."
Storage system is not under exclusive control by other tools.
 - "The Storage System is in use by other TOOL."
A tool other than VDSHP controls the storage system exclusively.
The IP address of the host obtaining exclusive control is displayed.
 - "The Storage System is in use by other VDSHP."
VDSHP controls the storage system exclusively.
The IP address of the host obtaining exclusive control is displayed.
- (5) If the storage system is exclusively controlled, a message to confirm whether to forcibly unlock the storage system appears. Input the value according to the displayed message.
- (6) After the process is completed successfully, the message "The Storage System Force Unlocked." appears.
- (7) Press the ENTER key to return to the Main Menu.

7.4 Errors

7.4.1 Tool Startup Blocked by Other Software

If the storage management software (Storage Manager for SANs, DiskRAID, Computer Management, or Disk Management) is running, the following dialog box appears. Stop the storage management software and execute the configuration tool (F3GLVdFa.exe) again.

If the following message appears after stopping the software, restart the Windows.



Note

ETERNUS VDSHP service and the configuration tool (F3GLVdFa.exe) cannot be used concurrently.

When using Storage Manager for SANs, DiskRAID, Computer Management, or Disk Management, ETERNUS VDSHP service starts automatically. If exiting from the relevant software, the ETERNUS VDSHP service is also stopped.

7.4.2 List of Tool Error Messages

The following messages are displayed on the console:

Message	Meaning
A LAN communication error occurred. Or, the specified IP address is not for a storage system.	Check the LAN connection and the IP address or network port settings for the storage system.
Another storage management software is operating the storage system.	Since storage management software other than VDSHP is using exclusive control, the IP address cannot be registered. Quit the other storage management software and register the IP address.
Failed to access to the registry.	Failed to access the registry. Reinstalling VDSHP may solve the problem.
Failed to issue Win32API.	Failed to issue Win32API, and cannot continue the process. Insufficient memory may occur. Check the system configuration.
The actual I/F does not correspond with the Host I/F that was set using VDSHP.	Confirm that Host I/F setting for VDSHP matches the actual I/F.
The Protected LUN value in registry is too large. Protected LUN must be 292 or less per a storage system.	Data in the Protected LUN in the registry is too large and cannot protect the LUN. Edit the registry to reduce the data size of Protected LUN.
The server is not connected to the storage system.	Server and the storage system are not connected via FC, SAS, or iSCSI. Check the connection.
The setting tool has been already running.	The setting tool has been already running. Use the running setting tool for configuration.

Message	Meaning
The specified command is invalid.	Invalid command has been input.
The specified number is invalid.	Invalid number has been input.
The specified IP address has not been registered. Specify the registered IP address.	Unregistered IP address is input when performing force unlock of the storage system.
The specified IP address is invalid.	IP address is input with invalid format.
The specified user name or password is invalid. Specify the correct user name or password.	User name/password with invalid format has been input, or input value does not match the user name/password registered in the storage system.
The storage system is in use by other TOOL.	Tool other than VDSHP is using the storage system exclusively.
The storage system is in use by other VDSHP.	Other VDSHP is using the storage system exclusively.
The storage system is not locked.	The storage system is not being used exclusively by any tools.
The storage system that is not controlled by VDSHP is connected.	Confirm that the VDSHP supports the connected storage system.
VDSHP on another server is operating the storage system.	VDSHP in the other server is using exclusive control, and the IP address cannot be registered. Quit the other VDSHP and register the IP address.

Chapter 8 Cautions and Troubleshooting

8.1 System Design and Environmental Configuration Cautions

8.1.1 Matching VDSHP Versions for all Servers

The VDSHP version for each server must be the same. Exclusive methods for a storage system and changing configuration procedures are different for each version. Therefore, confirm that VDSHP installed in each server has the same version number.

8.1.2 Setting the Storage System Host Responses

Host Response settings other than "Default" may be required according to the hardware and software environments. Refer to "Server Connection Guide" for details on whether settings other than "Default" are required.

If the storage system is required to be operated with Host Response settings other than "Default", perform the appropriate Host Response settings using ETERNUS Web GUI. Also, refer to ["8.2.2 Resetting Host Responses After "Default" Reversion" \(page 48\)](#).

8.1.3 Changing the Host I/F Type

VDSHP supports Fibre Channel, SAS, and iSCSI host interfaces.

- Windows Server 2003 and Windows Server 2008
The server can use only one type of host interface at a time. The host interface type information in use is stored in the registry. VDSHP refers to the value and determines the operation target host interface. The default setting is Fibre Channel.
When changing the connecting host interface, use VDSHP Configuration Tool (F3GLVdFa.exe).
Refer to ["7.3.2 Changing the Host I/F Type" \(page 37\)](#) for detailed procedure.
- Windows Server 2008 R2
The server can use multiple types host interfaces concurrently. Changing the host interface settings is not required.

8.1.4 Auto-Selecting Disks

When LUNs are created or expanded using Storage Manager for SANs, or DiskRAID (with no drives specified), VDSHP will select which of the storage system's drives are used, in accordance with predetermined disk selection rules.

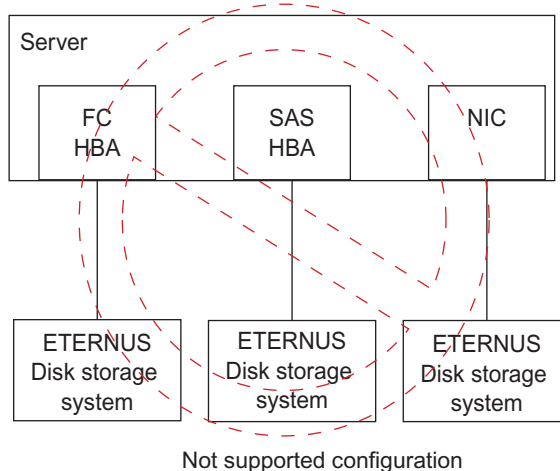
This can result in the use of different and more drives than expected, leading to a shortage of available drives. To ensure that only the expected drives are used, specify these drives to DiskRAID or use ETERNUS Web GUI.

8.1.5 Connecting Multiple Storage Systems

When multiple storage systems are connected to one server, the following requirements must be met. Otherwise, assigning LUNs may fail, or LUN assignment that has already been executed may be canceled due to the method for LUN assignment of Storage Manager for SANs.

■ Interface type

For Windows Server 2003 and Windows Server 2008, connect storage systems with only one type of host interface (Fibre Channel, SAS, iSCSI) to a server. Do not connect storage systems that have different host interfaces to a server.

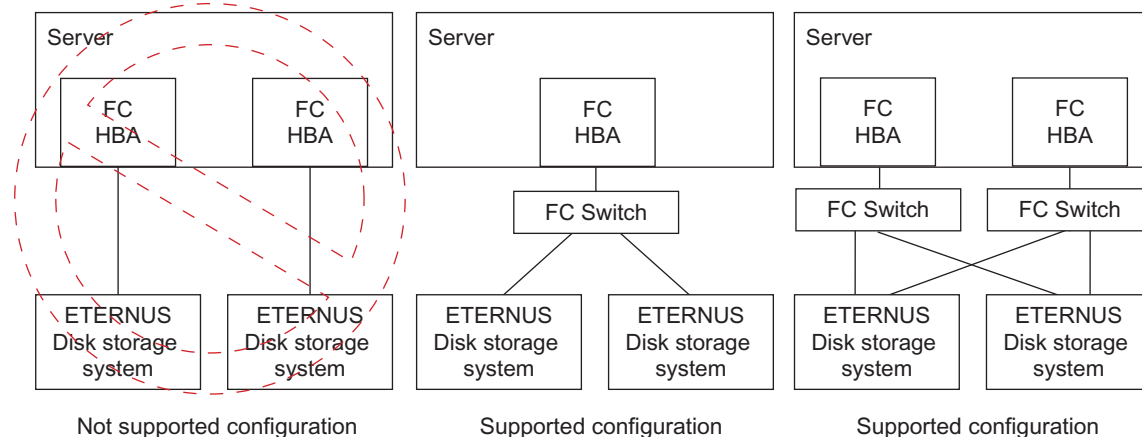


Note

For Windows Server 2008 R2, there are no restraints on the type of the host interfaces used.

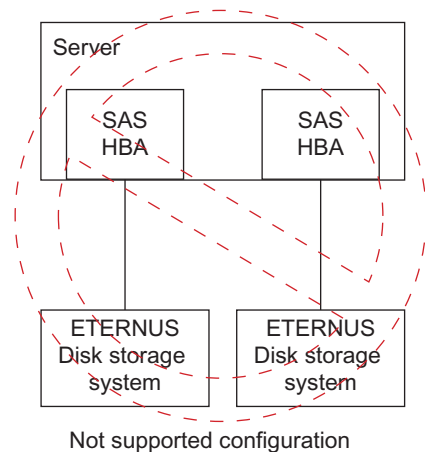
■ Fibre Channel interface

When connecting multiple storage systems with Fibre Channel interface, connect them to the same HBA by using a Fibre Channel Switch.



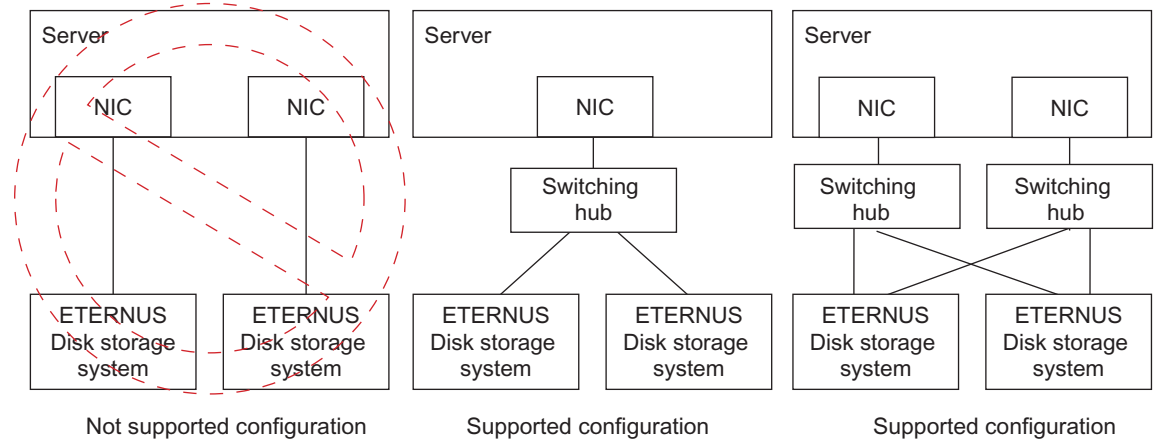
■ SAS interface

Do not connect multiple storage systems.



■ iSCSI interface

When connecting multiple storage systems with iSCSI interface, connect them to the same LAN card by using the switching hub.



8.2 Storage Manager for SANs and DiskRAID Notes

8.2.1 Managing when Using Multiple Servers

It is possible to run Storage Manager for SANs on multiple servers to check the storage system status. However, some update operations (such as LUN assignment) must be performed by a single server. Use [Refresh] after completing the update operation to ensure the latest information is displayed.

Similar restrictions apply to DiskRAID. Viewing the storage system from multiple servers is possible, but update operations must be performed by a single server only, then [Refresh] used to display the post-update information.

8.2.2 Resetting Host Responses After "Default" Reversion

Host Response settings may revert to their "default" state when using Storage Manager for SANs or DiskRAID to assign LUNs if either of the following conditions apply:

- LUN assignment target storage system Affinity Mode setting is "OFF".
- LUN assignment target server HBA has not been used by the storage system before.

If the server connection environment requires a setting other than the default value, correctly setup Host Response using ETERNUS Web GUI.

8.2.3 Changing the LUN Assignments

No application must access the target LUN when changing the LUN assignment. Make sure not to use Microsoft Cluster Service (MSCS) or Windows Server Failover Cluster (WSFC) during the LUN assignment. This may cause the application or cluster error.

8.2.4 Re-Recognizing LUNs

Even after assigning LUNs or releasing assigned LUNs while Windows is running, LUN recognition of Windows does not change. The server must be rebooted to enable correct recognition of LUNs.

8.2.5 VDSHP Installation/Uninstallation and VDSHP Configuration Tool (F3GLVdVa.exe) Startup Failures

When VDSHP is installed or uninstalled, or VDSHP Configuration Tool (F3GLVdVa.exe) is started, the following message may appear.



In this case, perform the following procedure.

Procedure

- 1 If the Storage Manager for SANs, DiskRAID, Computer Management, or Disk Management is running, exit it.
- 2 Click [Program] - [Management Tool] - [Service] to check the service list. Use the service list to stop [Virtual Disk Service].

End of procedure

8.2.6 LUN Assignment and Storage Manager for SANs or DiskRAID Startup Errors

In an environment where other management tools such as ETERNUS Web GUI and ETERNUS SF Storage Cruiser configure the Affinity Setting (LUN Assignment Setting), unsupported settings may be configured. In this case, errors occur when assigning LUNs or starting up the Storage Manager for SANs or DiskRAID and VDSHP cannot be used. Refer to "Event ID: 1003" of ["Chapter 9 Event Logs" \(page 63\)](#) for unsupported settings.

8.2.7 Restrictions Applying During Migration Processes

When a Migration process is running in the storage system, Storage Manager for SANs and DiskRAID may not be used to create, delete, expand, rename, or reassign the Migration target LUNs, and any attempt to do so will error-fail. These operations may be still be performed on Migration non-target LUNs.

8.2.8 Restrictions Applying During LDE Processes

When a Logical Device Expansion (LDE) process is running in the storage system, Storage Manager for SANs and DiskRAID may not be used to create any LUNs, irrespective of whether they are in the LDE area or not. On the other hand, Storage Manager for SANs and DiskRAID may be used to delete, rename, and reassign LUNs during LDE, irrespective of whether they are in the LDE area or not.

8.2.9 Restrictions Applying During Other Background Processes

Other than Migrations and LDEs, no Storage Manager for SANs or DiskRAID operations may be performed when any background processes (e.g. disk diagnostics, hot spare registration, firmware swaps, etc.) are running. Any attempt to create, delete, expand, rename, or reassign LUNs will error-fail. Attempting to refresh the screen is considered a null-operation (nop) and does not refresh the screen.

8.2.10 Restrictions Applying when a RAID Group is in an Error State

When a RAID Group is in an error state, Storage Manager for SANs and DiskRAID may not always be able to create and expand LUNs. However, LUNs may still be deleted, renamed and reassigned.

8.2.11 Displaying Path Information

LUN path information is only displayed if ETERNUS Multipath Driver V2.0 or later is installed. LUN path information is not displayed for SAS configurations. For some HBA drivers, the LUN path information may not be displayed correctly if a path error occurs.

8.2.12 Startup Restrictions After a Dirty Shutdown

Because of the VDSHP specification, if a dirty shutdown occurs during exclusive control, starting up the Storage Manager for SANs or DiskRAID may not be available for 3 minutes after shutdown. Wait for 3 minutes after a dirty shutdown and startup the Storage Manager for SANs or DiskRAID.

8.2.13 Errors Occurring During LUN Creation

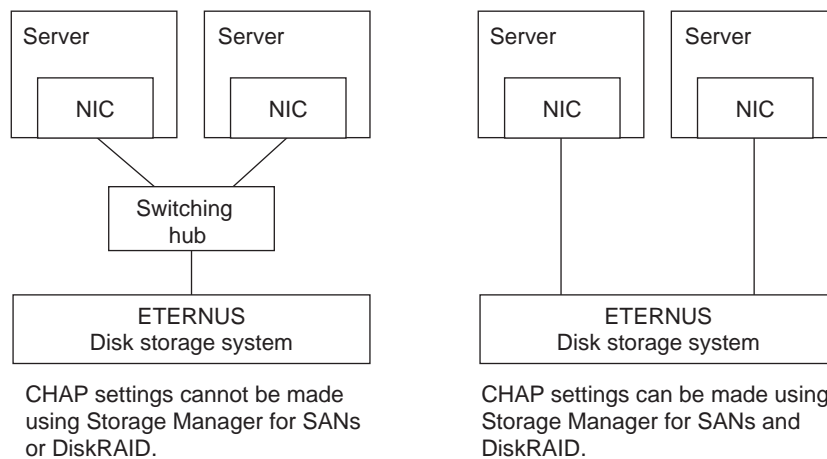
If the LAN cable connection is lost or the Storage Manager for SANs or DiskRAID fails while it is being used to create LUNs, then even though the LUN creation may subsequently appear to be complete in the Storage Manager for SANs or DiskRAID, the internal storage system LUN creation process will sometimes halt, and may never complete. In this case the LUN status shows as "Readying" in the ETERNUS Web GUI. Formatting the LUN using the ETERNUS Web GUI should solve the problem.

8.2.14 Fixed Relationship Between iSCSI Targets and Portals

The relationship between iSCSI Targets and Portals is fixed and may not be changed using the Storage Manager for SANs or DiskRAID.

8.2.15 CHAP Settings (iSCSI)

- Before performing the CHAP settings, the following steps are required:
 - Using iSCSI Software Initiator, log on to the iSCSI port of the ETERNUS Disk storage system whose CHAP settings are to be set.
 - Using Storage Manager for SANs or DiskRAID, assign LUNs so that at least one LUN is exposed to the iSCSI port of the ETERNUS Disk storage system whose CHAP settings are to be set.
- A CHAP user name cannot be specified by Storage Manager for SANs or DiskRAID. The iSCSI name set with iSCSI Software Initiator is used as the CHAP user name.
- As shown in the left side of the following figure, CHAP settings cannot be performed using Storage Manager for SANs or DiskRAID when multiple iSCSI Initiators (NICs) are connected to a single iSCSI port of the ETERNUS Disk storage system. In this situation, some other tool, such as the Web GUI, should be used for the CHAP settings.



8.3 Storage Manager for SANs Notes

8.3.1 Using the [Manage Server Connections] Window

WWN may not be displayed properly in [LUN Management] - [Manage Server Connections] of the Storage Manager for SANs, depending on the OS and host interface.
 The following phenomena may occur depending on the environment.

	FC	SAS	iSCSI
Windows Server 2003	No problem	1	No problem
Windows Server 2008	No problem	2	No problem
Windows Server 2008 R2	3 and 4	2 and 4	No problem

Phenomenon 1: No SAS WWN is displayed.

Phenomenon 2: Multiple SAS WWNs are displayed.

Phenomenon 3: No Fibre Channel WWN is displayed and SAS WWN is displayed.

Phenomenon 4: The same WWN is displayed for Fibre Channel and SAS.

The following explains the above phenomena and actions to take.

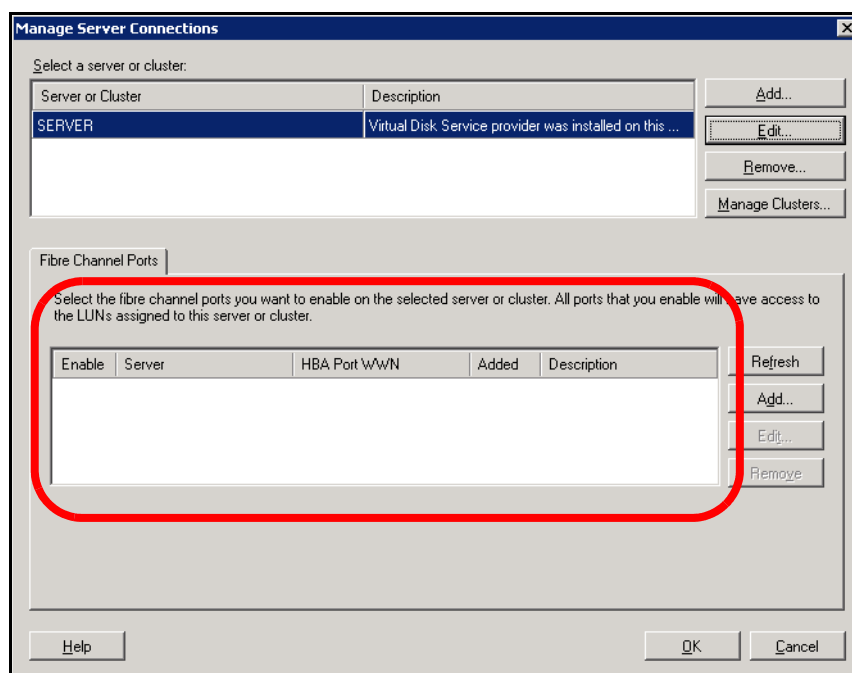
■ Phenomenon 1: No SAS WWN is displayed.

[OS]

Windows Server 2003

[Phenomenon]

No SAS WWN is displayed when SAS HBA(s) are installed in the server.



[Action]

Input SAS WWN(s) manually. Refer to ["8.3.1.1 Obtaining Server-side SAS WWNs" \(page 56\)](#) for how to obtain SAS WWNs.

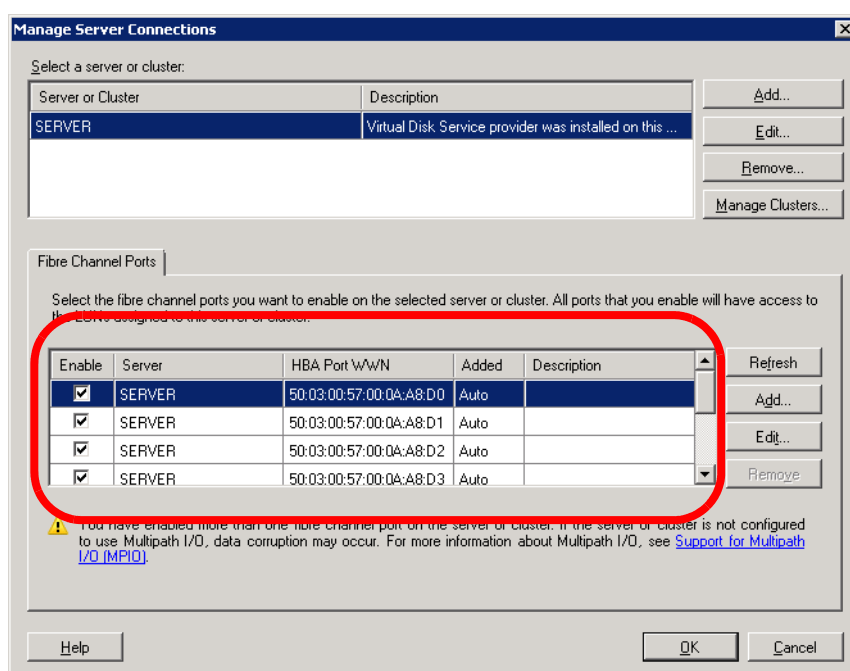
- Phenomenon 2: Multiple SAS WWNs are displayed.

[OS]

Windows Server 2008 or Windows Server 2008 R2

[Phenomenon]

When only one SAS HBA is installed in the server, multiple SAS WWNs are displayed. Also, when a SAS chip is installed on the server system board, the SAS chip WWN is also displayed.



[Action]

Clear the WWN checkboxes that are not associated with the ETERNUS Disk storage system. Refer to ["8.3.1.1 Obtaining Server-side SAS WWNs" \(page 56\)](#) for how to identify SAS WWNs that are associated with the ETERNUS Disk storage system.

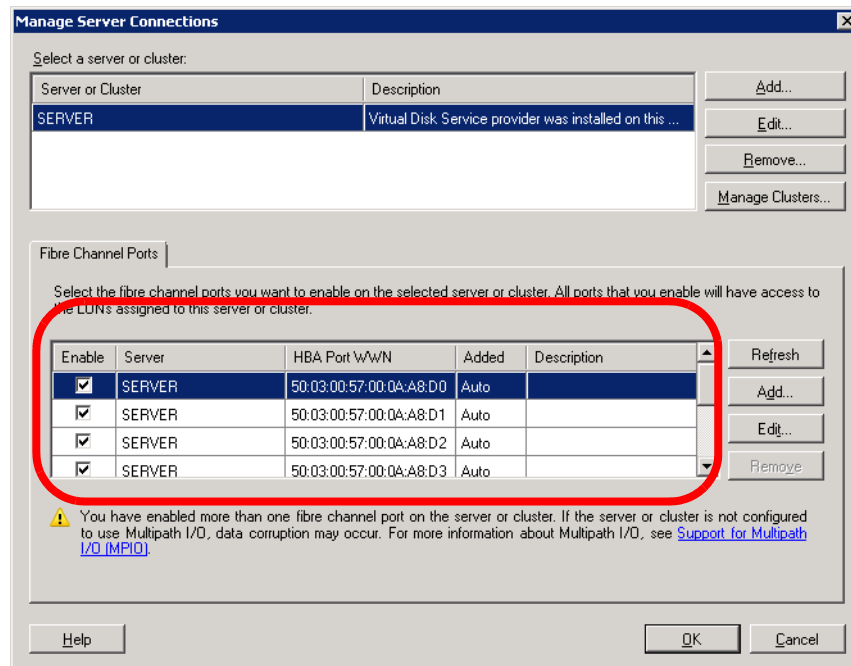
- Phenomenon 3: No Fibre Channel WWN is displayed and SAS WWN is displayed.

[OS]

Windows Server 2008 R2

[Phenomenon]

When a SAS HBA is installed in the server or SAS chip is installed on the server system board, no Fibre Channel WWN is displayed even if a Fibre Channel HBA is installed, and only SAS WWN is displayed.



[Action]

Input the Fibre Channel WWN manually. Fibre Channel WWNs can be obtained from a Fibre Channel extended BIOS or tools provided by HBA vendors such as HBAnyware. Input the WWPN and clear the SAS WWN checkbox.

- Phenomenon 4: The same WWN is displayed for Fibre Channel and SAS.

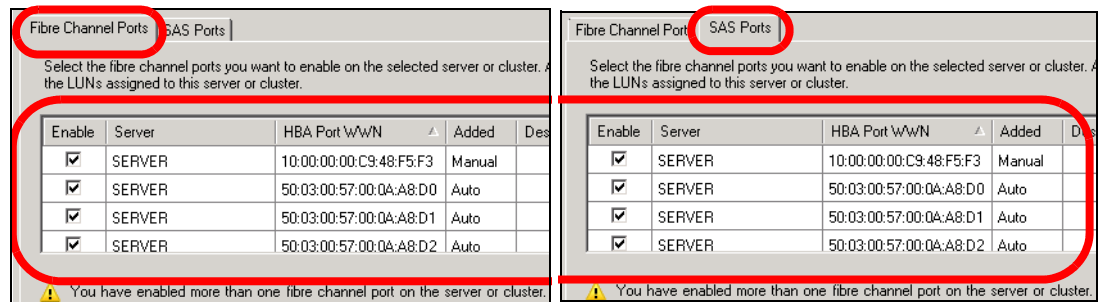
[OS]

Windows Server 2008 R2

[Phenomenon]

When the Fibre Channel type storage system and SAS type storage system are connected to one server, the [Fibre Channel Ports] and [SAS Ports] tabs are displayed and the same WWNs are displayed in both tabs.

For example, when WWNs are input or checkboxes are selected or cleared in the [Fibre Channel Ports] tab, the same contents are changed in the [SAS Ports] tab. Since different WWNs cannot be set for Fibre Channel and SAS, operations such as LUN assignment cannot be performed properly.



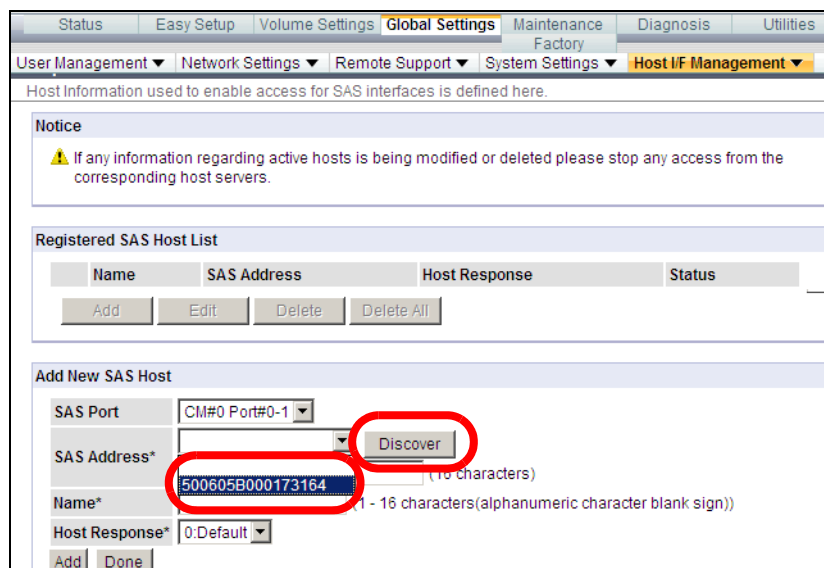
[Action]

When the Fibre Channel type storage system and SAS type storage system are connected to one server, use DiskRAID commands instead of Storage Manager for SANs to assign LUNs or perform other operations.

8.3.1.1 Obtaining Server-side SAS WWNs

SAS WWNs of the server connected with the storage system can be identified from the ETERNUS Web GUI window.

When the server and storage system are connected via SAS, the following ETERNUS Web GUI window for setting the SAS host is displayed. Click the [Discover] button to display server-side SAS WWNs.



8.3.2 Using Storage Manager for SANs in an iSCSI Environment

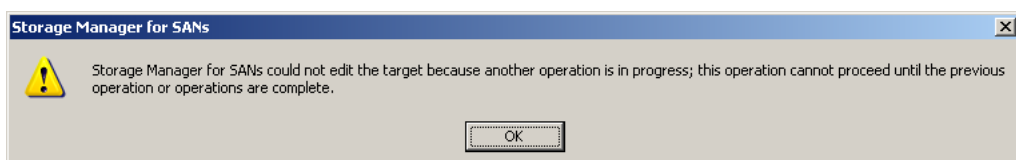
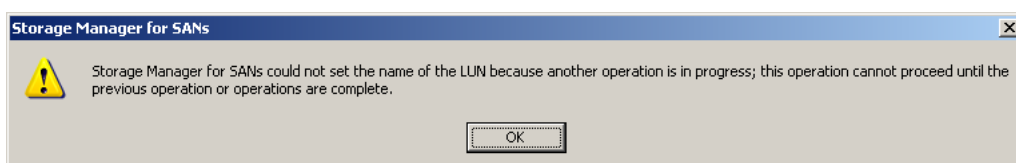
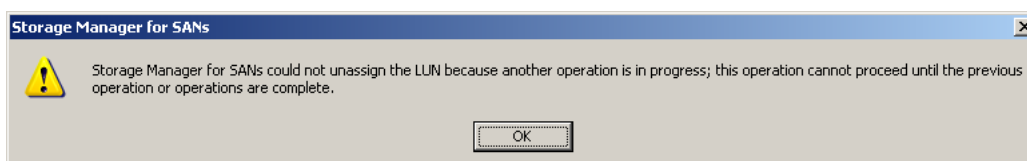
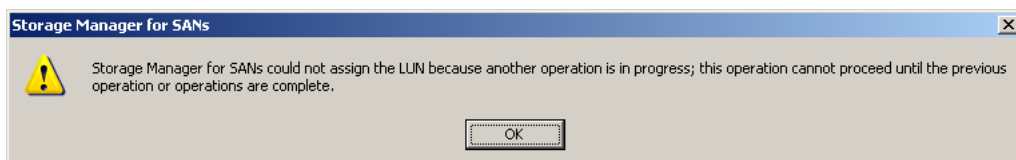
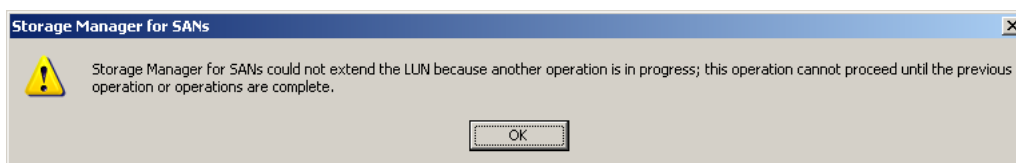
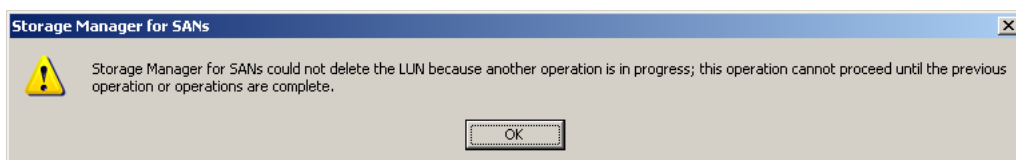
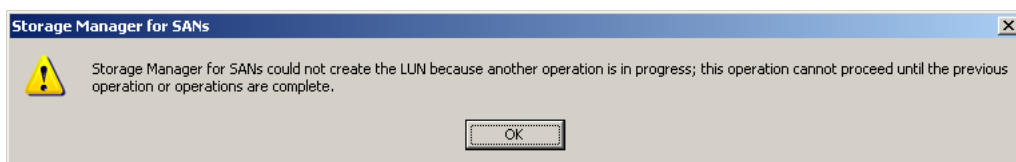
For iSCSI, do not log on via [LUN Management] - [Log On to iSCSI Targets].
 Unintended server IP address may be used to log on.

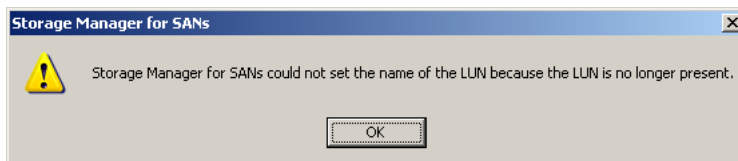
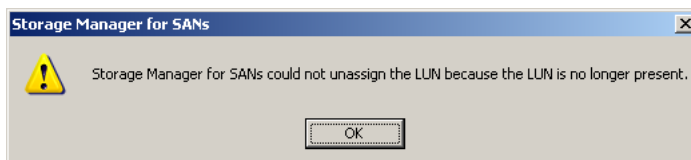
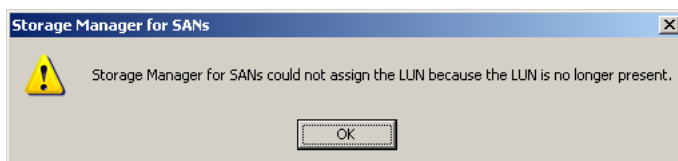
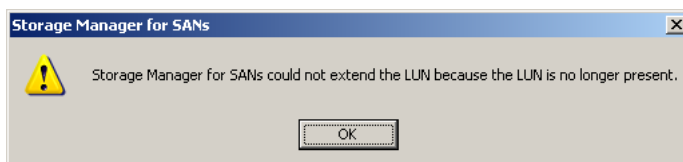
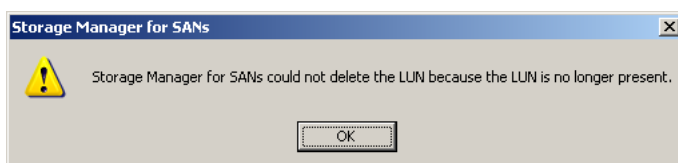
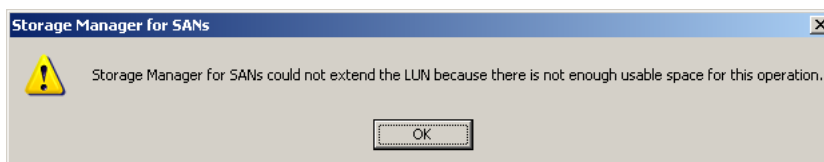
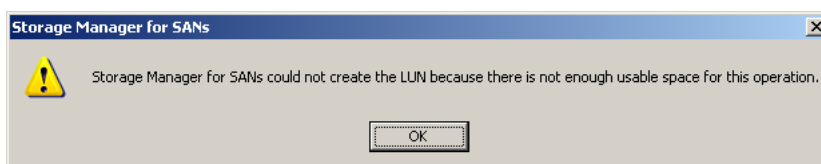
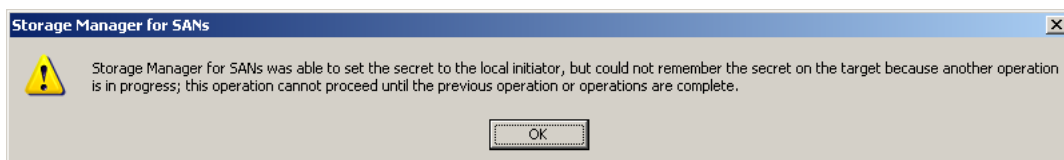
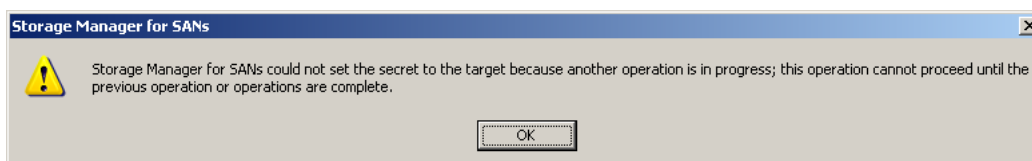
8.3.3 Storage Manager for SANs Error Status Indication

If a status other than "Online" is displayed, an error has occurred. Check the device status using ETERNUS Web GUI.

8.3.4 Storage Manager for SANs Concurrent Operation Errors

The following messages may appear when using the Storage Manager for SANs.







When these messages appear, close the Storage Manager for SANs, open it again, and retry the operation. If other management software such as ETERNUS Web GUI or ETERNUS SF Storage Cruiser is in use, exit the software.

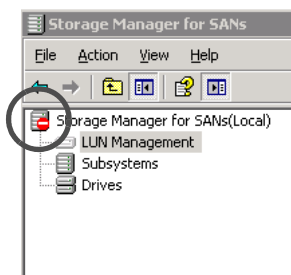
If another server is updating the storage system using Storage Manager for SANs or DiskRAID, do not perform the updating operation.

These messages may appear because VDSHP only controls the storage system exclusively when changing the configuration of the storage system.

8.3.5 Waiting for the Error Status Icon to Disappear

When configuring VDSHP using Storage Manager for SANs, it takes a few minutes for the settings to take effect, during which time the following Error icon is displayed. In this case, wait for about 10 seconds for the normal status icon to reappear after setting.

Always wait until the normal screen appears before continuing the setting process.



8.3.6 Storage Manager for SANs Event Logs

When a multipath driver is installed, and Multipath connection is used, application event logs of Storage Manager for SANs may be recorded as shown below. These events do not cause any problems for normal operation.

```
Event Type: Warning
Event Source: Storage Manager for SANs
Event Category: non
Event ID: 0

Description:
Storage Manager for SANs encountered the following error(s) while loading
information from Virtual Disk Service (VDS) or VDS hardware provider(s).
Some of the functionality may not be available on the hardware
provider(s).

Lun - 'new2(LV0001)'
Service.GetObject - 'System.ArgumentException - 'Unknown VDS object type
specified.
Parameter name: type''
```

```
Event Type: Warning
Event Source: Storage Manager for SANs
Event Category: non
Event ID: 0

Description:
Storage Manager for SANs encountered the following error(s) while
obtaining information from Virtual Disk Service (VDS) or VDS hardware
provider(s). Some of the functionality may not be available on
the hardware provider(s).

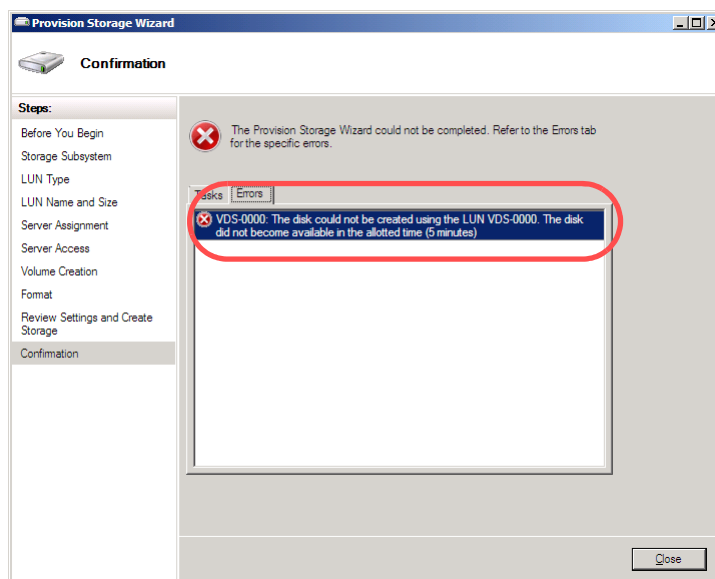
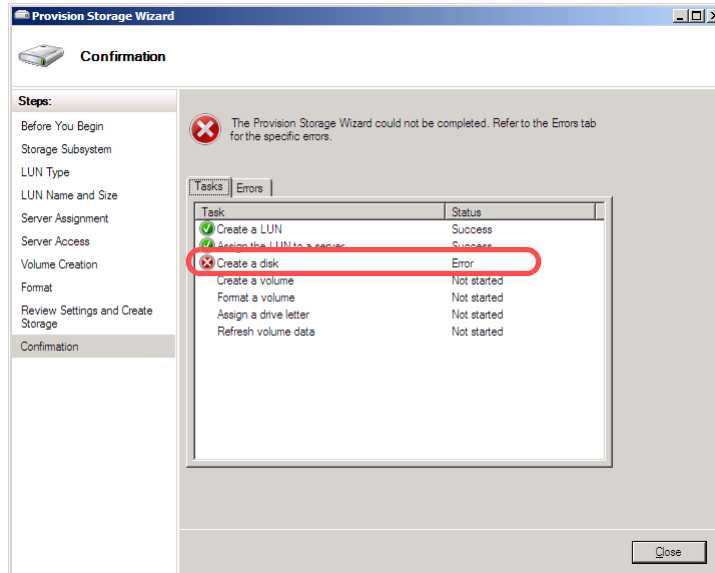
Lun - 'Quorum Disk Lun'
IVdsService.GetObject - 'System.Runtime.InteropServices.COMException -
'Exception from HRESULT: 0x80042448''
IVdsService.GetObject - 'System.Runtime.InteropServices.COMException -
'Exception from HRESULT: 0x80042448''
```

8.3.7 Storage Manager for SANs Exit Error

If the desktop is set to 256-color, Microsoft Management Console displays a dialog box that indicates a failure when Storage Manager for SANs is exited.

8.3.8 "Create a Disk" Task Error

When a LUN is created, the following error may occur.



This problem is known to occur when a LUN is to be created immediately after another LUN has been deleted. Use the following procedure to recover from the error status.

Procedure

- 1 Close (exit) the Storage Manager for SANs.
- 2 Open the [Device Manager] window and move the cursor to the disk drive icon that has a warning sign displayed under [Disk drives].
- 3 Right-click to disable the disk with the warning sign and again to re-enable it.

- 4 Open the [Disk Management] window, find the newly displayed unformatted disk, then initialize it, assign it a drive letter and format it.
To prevent this problem, a gap of at least 30 seconds is recommended between LUN deletion and any subsequent LUN creation.

End of procedure

8.4 DiskRAID Notes

8.4.1 Problem Re-starting DiskRAID Immediately After Exit

After DiskRAID is exited and the software is immediately started again, the starting up process of the DiskRAID may fail and the following message may appear.

```
DiskRAID encountered a fatal error while initializing.  
The following information may help diagnose the error:  
Error: 0x80080005  
Location Code: 2
```

If this message appears, wait a while and start DiskRAID again.

8.4.2 Problem Starting DiskRAID

If the status of Virtual Disk Service and VDSHP does not match, DiskRAID cannot be started, and the following message may appear.

```
DiskRAID was unable to find any VDS hardware providers installed on this computer.  
At least one VDS hardware provider must be installed for DiskRAID to be functional.  
Please check the VDS hardware provider installation.
```

Use the service list to check whether the status of the Virtual Disk Service and VDSHP matches or not. Click [Program] - [Management Tool] - [Service] to check the service list.

Status of "Virtual Disk Service": Started
Status of "ETERNUS VDS Hardware Provider": Stopped

If this condition occurs, stop the "Virtual Disk Service".
When stopping the "Virtual Disk Service", close the screens for Storage Manager for SANs, Computer Management, and Disk Management. After stopping the "Virtual Disk Service", the DiskRAID can be start up normally.

Chapter 9 Event Logs

VDSHP stores the following Event Logs. Check the Event Logs when an error or abnormal status occurs.

Type is "Application", and source is "F3GLVdFa".

Event ID: 1001

- ☐ Type: Error
- ☐ Message: Cannot connect Storage.
"IP Address = xx.xx.xx.xx"
"ErrorCode = x"
- ☐ Details: Cannot connect to the storage system via the specified IP address.
 IP address is not correct, or storage system is not connected, etc.
"IP Address = xx.xx.xx.xx" indicates the IP address for the storage system, and *"ErrorCode = x"* indicates the error type information.

Event ID: 1002

- ☐ Type: Error
- ☐ Message: The following is over maximum number.
"Overflow Type" = "Maximum value"
- ☐ Details: The following shows characters that are displayed in *"Overflow Type"* and their meanings:
 - Affinity Group: Number of information for LUN assignment exceeds the maximum.
 - Logical Volume (OLU): Number of LUNs exceeds the maximum.
 - Logical Volume (SLU): Number of LUN areas in use exceeds the maximum.
 - Logical Volume (SLU in OLU): Number of concatenated LUN areas exceeds the maximum (16).
 - RAID Group: Number of RAID groups exceeds the maximum.
 - WWN Number: Number of registered World Wide Names or SAS addresses exceeds the maximum.

Event ID: 1003

- ☐ Type: Error
- ☐ Message: The affinity setting in the storage system is not supported.
"Affinity Setting"
- ☐ Details: The following shows characters that are displayed in *"Affinity Setting"* and their meanings:
 - Affinity Group: Affinity group is concatenated.
 - LUN MAP: The maximum number of Affinity Groups able to be registered has been reached.

Event ID: 1004 (For Fibre Channel/SAS)

- ☐ Type: Error
- ☐ Message: Cannot find connection.
"WWN = xxxxxxxxxxxxxxxxx"
- ☐ Details: Specified World Wide Name or SAS address when assigned cannot be recognized by the storage system port.

Event ID: 1005

- ☐ Type: Error
- ☐ Message: The error was reported from the storage system while issuing the control command.
"Error detailed information"
- ☐ Details: An error occurred during communication with the storage system. "Error detailed information" indicates the internal status reported by the storage system.

Event ID: 1006

- ☐ Type: Error
- ☐ Message: The storage system is being used for another tool.
"IP Address = xx.xx.xx.xx"
- ☐ Details: Another tool is using the storage system exclusively.
"IP Address = xx.xx.xx.xx" indicates the Public LAN IP address for the server uses the storage system exclusively.

Event ID: 1007

- ☐ Type: Error
- ☐ Message: User name or password is invalid.
- ☐ Details: Specified storage system user name or password is invalid.

Event ID: 1008

- ☐ Type: Error
- ☐ Message: The setup tool is in operation.
- ☐ Details: VDSHP Configuration Tool (F3GLVdVa.exe) is in operation and cannot start the VDSHP service. Quit the VDSHP Configuration Tool.

Event ID: 1009 (For iSCSI)

- ☐ Type: Error
- ☐ Message: The specified iSCSI Initiator is not connected.
"IP Address = xx.xx.xx.xx"
- ☐ Details: IP address corresponding to the specified iSCSI name when assigned, cannot be recognized in port of storage system. "IP Address = xx.xx.xx.xx" is the iSCSI IP address for the server.

Event ID: 1012

- ☐ Type: Error
- ☐ Message: The operation cannot be executed because the background process is in progress in the storage system.
- ☐ Details: A background process such as LDE, Migration, or FirmUp is in progress in the storage system and the requested operation cannot be executed.

Event ID: 1013

- Type: Error
- Message: The specified LUN could not be deleted because it has been registered as Protected LUN.
"LUN-V No. = 0xXXXX"
- Details: The specified LUN has been registered as Protected LUN, and cannot be deleted. "LUN-V No. = 0xXXXX" indicates the LUN-V number for the specified LUN.

Event ID: 1014

- Type: Error
- Message: The LUN size is too small to be extended.
"LUN-V No. = 0xXXXX"
- Details: Size of the specified LUN is less than 1GB, and cannot be extended.
This LUN may be created by software other than VDSHP.
"LUN-V No. = 0xXXXX" indicates the LUN-V number for the specified LUN.

Event ID: 1015

- Type: Error
- Message: The IP address of a storage system that is not controlled by VDSHP has been registered.
"IP Address = xx.xx.xx.xx"
- Details: The IP address of a storage system that is not supported by VDSHP is registered.
Unsupported storage system cannot be controlled using VDSHP.
"IP Address = xx.xx.xx.xx" indicates the IP address for the storage system.

Event ID: 1016

- Type: Error
- Message: The actual I/F does not correspond with the Host I/F that was set using VDSHP.
"IP Address = xx.xx.xx.xx"
- Details: The Host-I/F specified in the VDSHP and the actual Host-I/F does not match, and cannot be controlled.
"IP Address = xx.xx.xx.xx" indicates the IP address for the storage system.

Event ID: 1017

- Type: Error
- Message: There is a User Disk in the slot that is exclusive for System Disk installation.
"IP Address = xx.xx.xx.xx"
- Details: A User Disk has been created in the slot that is exclusive for System Disk on the ETERNUS8000.
Do not create a User Disks in the slot for the System Disk.
"IP Address = xx.xx.xx.xx" indicates the IP address for the storage system.

Event ID: 1018

- Type: Error
- Message: The mistake is found in the setting of Source IP or Target Portal on iSCSI Software Initiator.
 "Source IP Address : xx.xx.xx.xx"
 "Target IP Address : xx.xx.xx.xx"
- Details: Source IP address or target portal for the iSCSI Software Initiator is not specified. The default settings may be specified. Refer to "Server Connection Guide (iSCSI)", and check the iSCSI Software Initiator settings.
 "Source IP Address : xx.xx.xx.xx" indicates the IP address for the iSCSI in the server. "Target IP Address : xx.xx.xx.xx" indicates the IP address for the storage system. However, if either or both of them are specified incorrectly, "0.0.0.0" is displayed.

Event ID: 1019

- Type: Error
- Message: Communication with the storage system was not possible. There is a problem with the network, or the storage system network settings are disabled.
 "IP Address : xx.xx.xx.xx"
- Details: The following may be possible causes.
 - The specified storage system IP address is incorrect.
 - The sever and storage system are not connected via a network.
 - The storage system [Maintenance Connection] setting is disabled. Select the port (MNT or RMT)(*1) to be set from [Settings] - [Others] - [Network Environment Settings] on the ETERNUS Web GUI, and select [Enable] for [Maintenance Connection] in the displayed screen.

*1: Whether to choose MNT or RMT depends on the environment. Select the LAN that is communicating with the VDSHP.

"IP Address : xx.xx.xx.xx" indicates the IP address for the storage system.

Event ID: 1020

- Type: Error
- Message: The HotSpare operation failed.
 "Error detailed information"
- Details: The following shows characters that are displayed in "Error detailed information" and their meanings:
 - No Drive: Can not find a drive that can be selected as a hot spare.
 - System Disk: System Disk drive is selected.
 - RAID Group: Drive that configures the RAID group is selected.
 - Drive is Broken: Error status drive is selected.
 - Dedicated HS: Drive that is set as a Dedicated Hot Spare is selected.

Event ID: 1100

- Type: Information
- Message: ETERNUS Hardware Provider has started.
- Details: The VDSHP has started.

Event ID: 1101

- Type: Information
- Message: ETERNUS Hardware Provider has stopped.
- Details: The VDSHP has stopped.

Event ID: 1200

- Type: Error
- Message: Win32API issuance error occurred.
"Error detailed information"
- Details: An error occurred for Win32API issuance, and the operation cannot be executed.
"Error detailed information" includes information about the location of the failure and internal status.

Chapter 10 Information Required For Troubleshooting

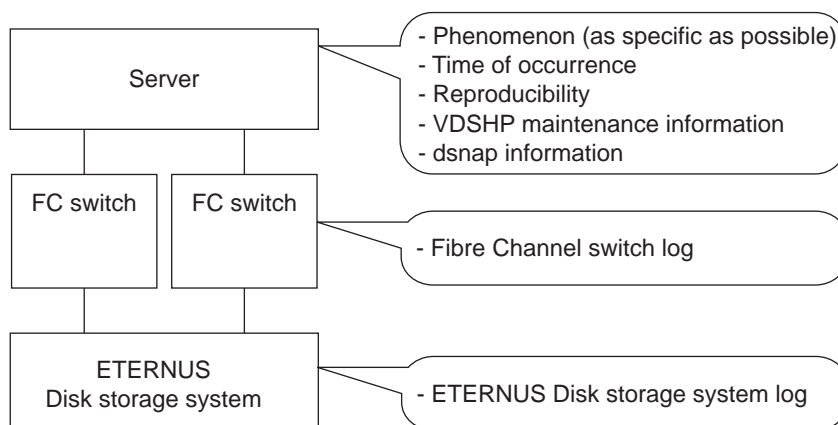
Provide the following information when an error occurs or when making an inquiry.

Required information for an Inquiry

- Phenomenon (as specific as possible)
- Time of occurrence
- Reproducibility

Obtaining information for an Inquiry

- VDSHP maintenance information
- dsnap information
- Fibre Channel switch log (when using the Fibre Channel switch)
- ETERNUS Disk storage system log

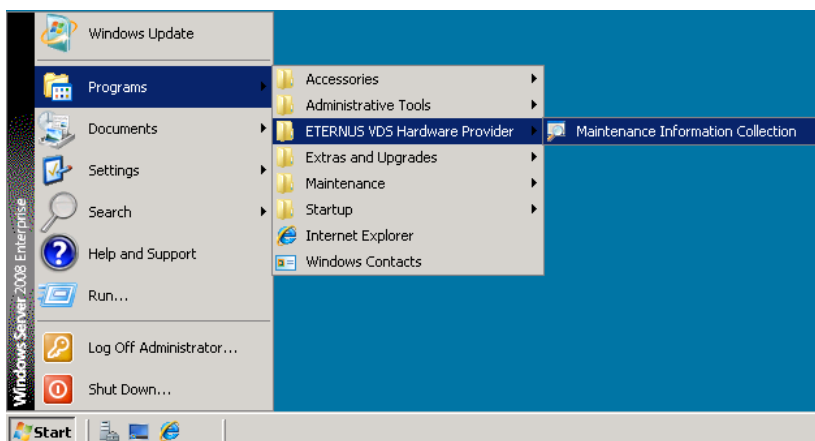


VDSHP maintenance information

Select [Maintenance Information Collection] from [Start] - [Programs] - [ETERNUS VDS Hardware Provider] and collect VDSHP maintenance information by following the instructions. This information is usually saved as a VDSHPxxxxxxxxxxx file in one of the following folders.

For 32bit OS: C:\Program Files\ETERNUS VDS Hardware Provider\snap

For 64bit OS: C:\Program Files (x86)\ETERNUS VDS Hardware Provider\snap



dsnap information

dsnap information is collected using the dsnap command. Contact your Fujitsu engineer for details about dsnap command.

Fibre Channel switch log

Usually, obtain the information displayed with "supportshow" command. Contact your Fujitsu engineer for details.

ETERNUS Disk storage system log

Obtain the log files using ETERNUS Web GUI. Contact your Fujitsu engineer for details.

Chapter 11 Revision Record

(1/1)

Date	Version	Details
2007/04/09	1.0.0	First edition
2007/08/31	1.0.1	<ul style="list-style-type: none"> • Supported ETERNUS2000 • Changed Friendly Name process • Changed Login process
2007/12/26	1.0.2	<ul style="list-style-type: none"> • Fixed the problem that a storage system cannot be recognized according to the software status • Fixed the problem that VDSHP does not operate when multiple storage systems are connected • Fixed a handle leak problem • Changed to synchronize the VDSHP service termination with SMFS service termination
2008/04/16	1.0.3	<ul style="list-style-type: none"> • Supported Windows Server 2008 • Supported ETERNUS2000 SAS and ETERNUS2000 iSCSI • Changed Login process
2008/05/16	1.0.4	<ul style="list-style-type: none"> • Changed conditions for LUN creation size • Changed Login process

Date	Version	Details
2008/12/10	1.1.0	<ul style="list-style-type: none"> • Supported overwrite installation • Supported ETERNUS2000 power interlock models • Supported RAID6 • Supported UNMASK LUN ALL • Supported LDE protection • Added manual setting function for host interface • Added function for RLU auto deletion mode • Added function to set the default RAID type • Added function to specify the number of disk drives when creating RLU • Added LUN protection function • Added release command for forcible lock • Lifted the restrictions on iSCSI configuration • Changed conditions for LUN creation size • Changed conditions for LUN expansion size • Modified the procedure for FriendlyName auto-assigning • Changed Login process • Ended the Hot Spare function support • Added description that iSCSI cluster multipath configuration is not supported.
2009/01/21	1.1.1	<ul style="list-style-type: none"> • Supported ETERNUS4000 models 400 and 600 • Supported ETERNUS8000 models 800, 1200, and 2200 • Added description when configuring RLU and expanding LUN for each disk drive type (FC, SATA, or SAS).
2009/05/27	1.2.0	<ul style="list-style-type: none"> • Supported ETERNUS DX60/DX80 FC • Supported new firmware V20L20 for ETERNUS4000 models 400 and 600 • Supported new firmware V20L20 for ETERNUS8000 models 800, 1200, and 2200 • Added description about VDSHP maintenance information collection function. • Integrated Japanese and English packages.

Date	Version	Details
2009/09/17	1.3.0	<ul style="list-style-type: none"> • Supported ETERNUS DX60/DX80 SAS/iSCSI • Supported ETERNUS DX60/DX80 SSD drives • Supported new firmware V20L30 for ETERNUS4000 models 400 and 600 • Supported new firmware V20L30 for ETERNUS8000 models 800, 1200, and 2200 • Supported multipath configuration in an iSCSI cluster • Supported ETERNUS DX400/DX8000 series
2010/02/15	1.4.0	<ul style="list-style-type: none"> • Supported Windows Server 2008 R2 • Supported ETERNUS DX90 • Supported Hot Spare • Supported Storage Pool • Supported drive LED blinking • Supported SCVMM • Changed specifications so that operation is possible even when the host interface between the server and storage system is not yet connected • Released Host Affinity Group status restriction

ETERNUS VDS Hardware Provider 1.4.0 Software Information

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